DOCUMENT RESUME

ED 133 214 SE 021 876

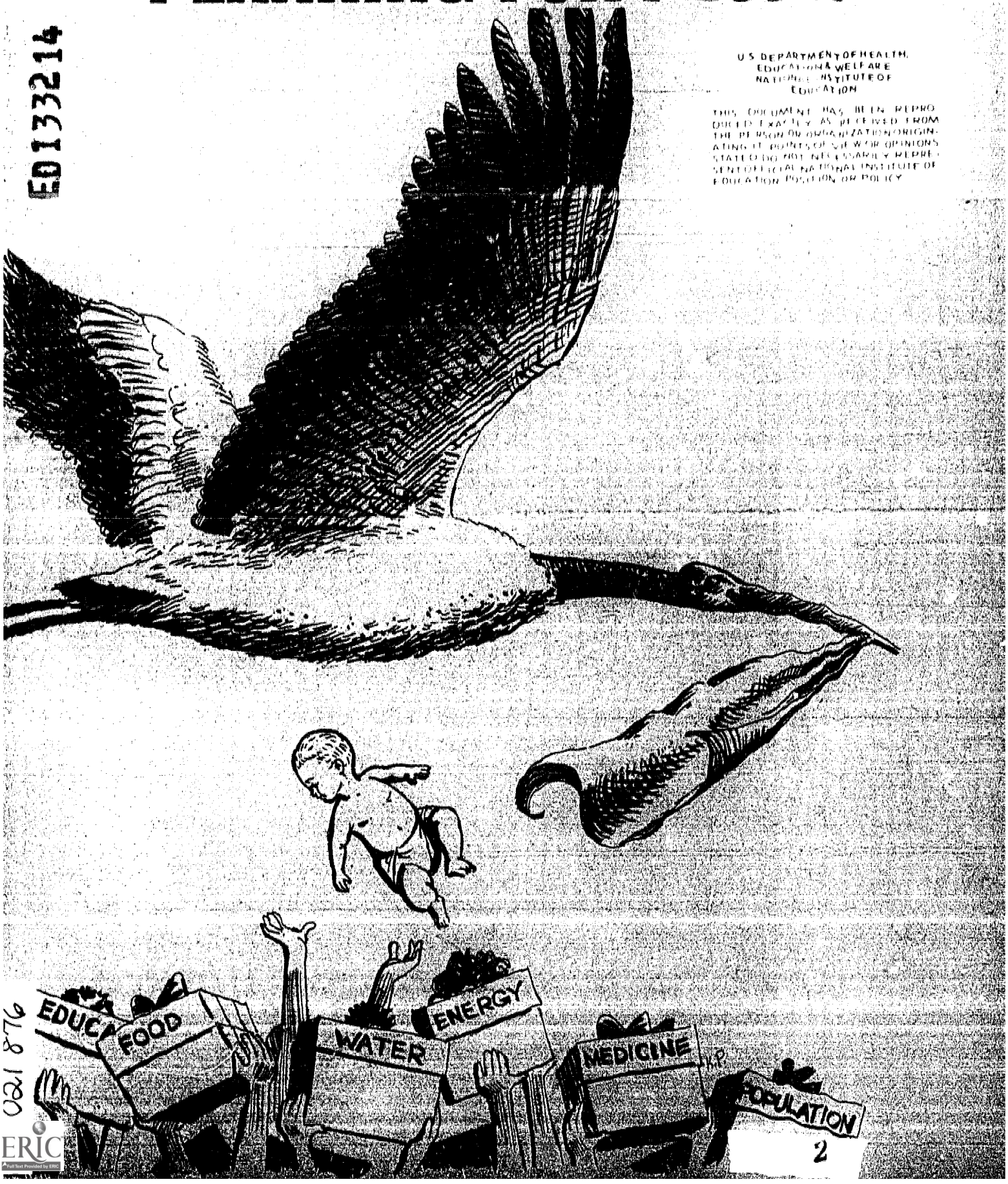
AUTHOR Smith, Dwight G.
TITLE Planning for People and Land Use Decision Making.
INSTITUTION Area Cooperative Educational Services, New Haven, Conn. Environmental Education Center.
SPONS AGENCY Office of Education (DHEW), Washington, D.C. Office of Environmental Education.
PUB DATE 75
NOTE 80p.; For related documents, see SE 021 868-882; Not available in hard copy due to marginal legibility of original document
AVAILABLE FROM E-P Education Services, c/o ACES, 800 Dixwell Avenue, New Haven, CT 06511 ($28.00 - price includes tape)

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS *Environment; Environmental Education; Higher Education; *Instructional Materials; Land Use; Natural Resources; *Population Education; Population Growth; *Population Trends; *Secondary Education; *Units of Study (Subject Fields)

ABSTRACT

This material includes student guide sheets, reference material, and tape script for the audio-tutorial unit on Planning for People. An audio tape is used with the materials. The material is designed for use with Connecticut schools, but can be adapted to other localities. The material in this unit considers population growth curves, factors that influence population trends, impact of population growth on the environment and resources, and community planning. (RH)

PLANNING FOR PEOPLE



PLANNING FOR PEOPLE

AND

LAND USE DECISION MAKING

WRITTEN AND DESIGNED BY: DWIGHT G. SMITH
PROFESSOR OF BIOLOGY
SOUTHERN CONNECTICUT
STATE COLLEGE

EDITED BY: HARRY O. HAAKONSEN
LARRY SCHAEFER

PRODUCED BY: E-P EDUCATION SERVICES
21 MERRIT ST.
HAMDEN, CT. 06511

We gratefully acknowledge: "Population Profiles" is reprinted by permission of the Population Reference Bureau; the map on guide sheet # 8 is reprinted from "Connecticut-A Thematic Atlas" by Allen R. Smith, by permission of the author; and guide sheet # 19 is largely based on a survey published by the Utah Progress Commission.

The project presented herein was performed pursuant to a grant from the U. S. Office of Education, Department of Health, Education and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U. S. Office of Education, and no official endorsement by the U. S. Office of Education should be inferred.

This material is printed on paper made from recycled fibers at Diamond International Corporation, Hyde Park, Massachusetts Mill.

GUIDE SHEET # 1

PLANNING FOR PEOPLE

Population growth has become an important issue of concern for people involved in the land use decision making process. Knowledge of the make up of a communities population can play an important role in determining the development needs of the community. This audio tutorial unit is designed to introduce you to the issue of population growth; techniques for analyzing population growth data; alternative patterns for future population growth; and the role of population data in land use decision making. At the conclusion of this unit, you should be able to:

1. Analyze population growth curves for the State of Connecticut and the world.

2. Estimate the impact of continued population growth on resource consumption, demand for goods and services, waste production and environmental pollution.

3. Apply population statistics to the computation of birth rate, death rate and population growth rate.

4. Compare and contrast the shape of age pyramids for populations that are increasing, decreasing or remaining constant in size.

5. Differentiate between population density and population distribution.

6. Identify portions of the official United States Census that would prove to be of value in land use decision making.

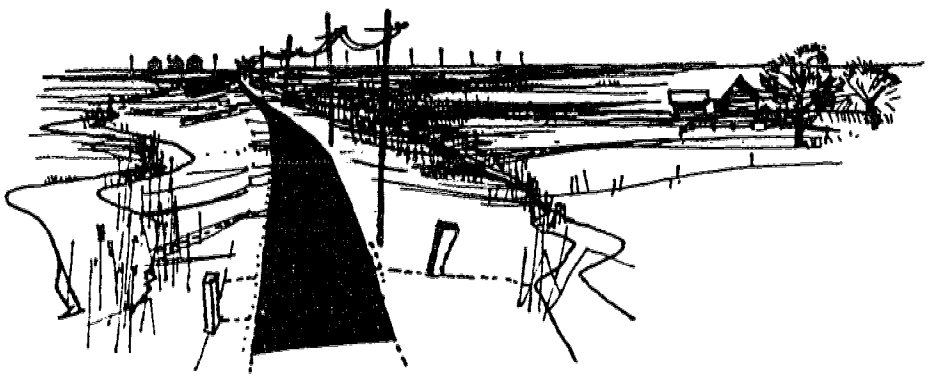
7. Utilize a community survey to help identify concerns and needs of your town.as well as interpret the results in terms of their impact on land use.

8. Describe ways in which population growth and census data can be utilized in the land use decision making process.

9. Describe how population projections for your community will affect the towns plan for development.

As you proceed through this unit, feel free to stop the recorder and study guide sheets that require additional time for analysis and interpretation. We know that you will find information in this unit to be of great value in planning for people!

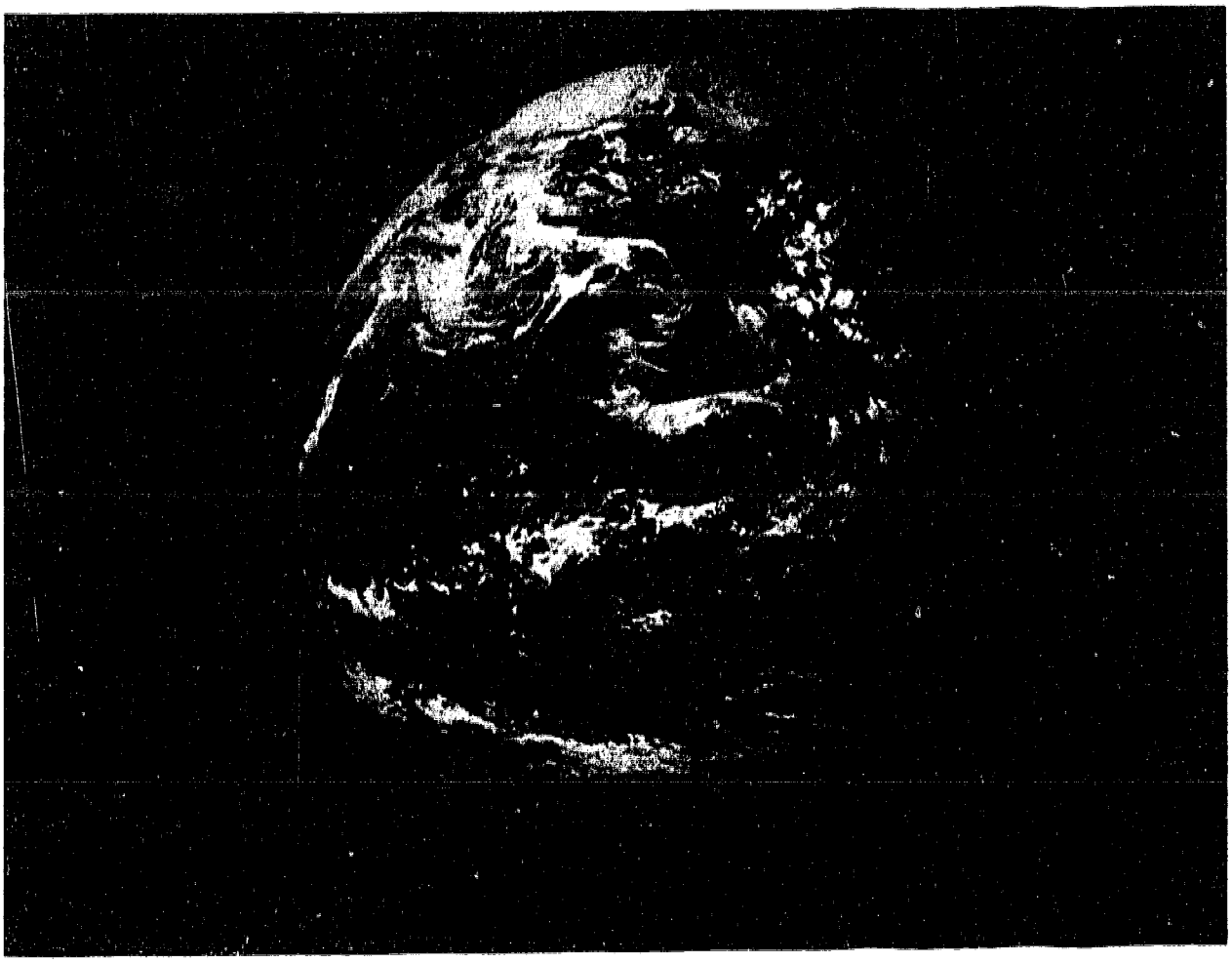
BE A RECYCLER YOURSELF. WRITE YOUR COMMENTS, NOTES, AND ANSWERS ON SCRAP PAPER INSTEAD OF THESE GUIDE SHEETS. IN THIS WAY, THESE GUIDE SHEETS WILL BE AVAILABLE FOR THE NEXT PERSON IN YOUR COMMUNITY WHO WILL BE MAKING USE OF THIS UNIT.



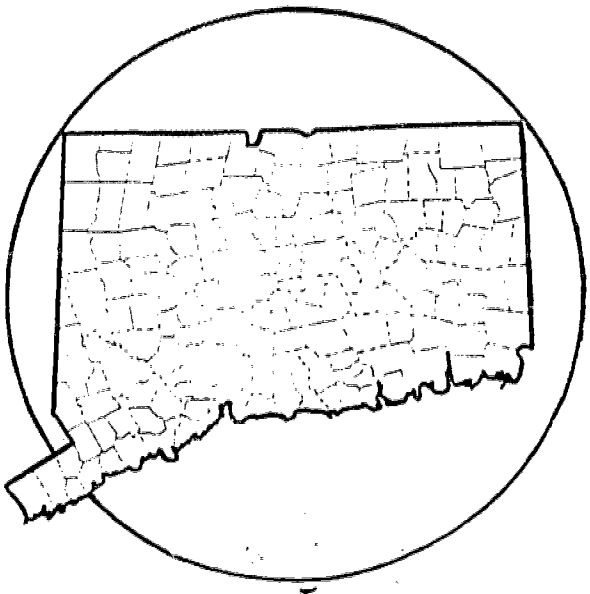
GUIDE SHEET # 2

PLANNING FOR PEOPLE

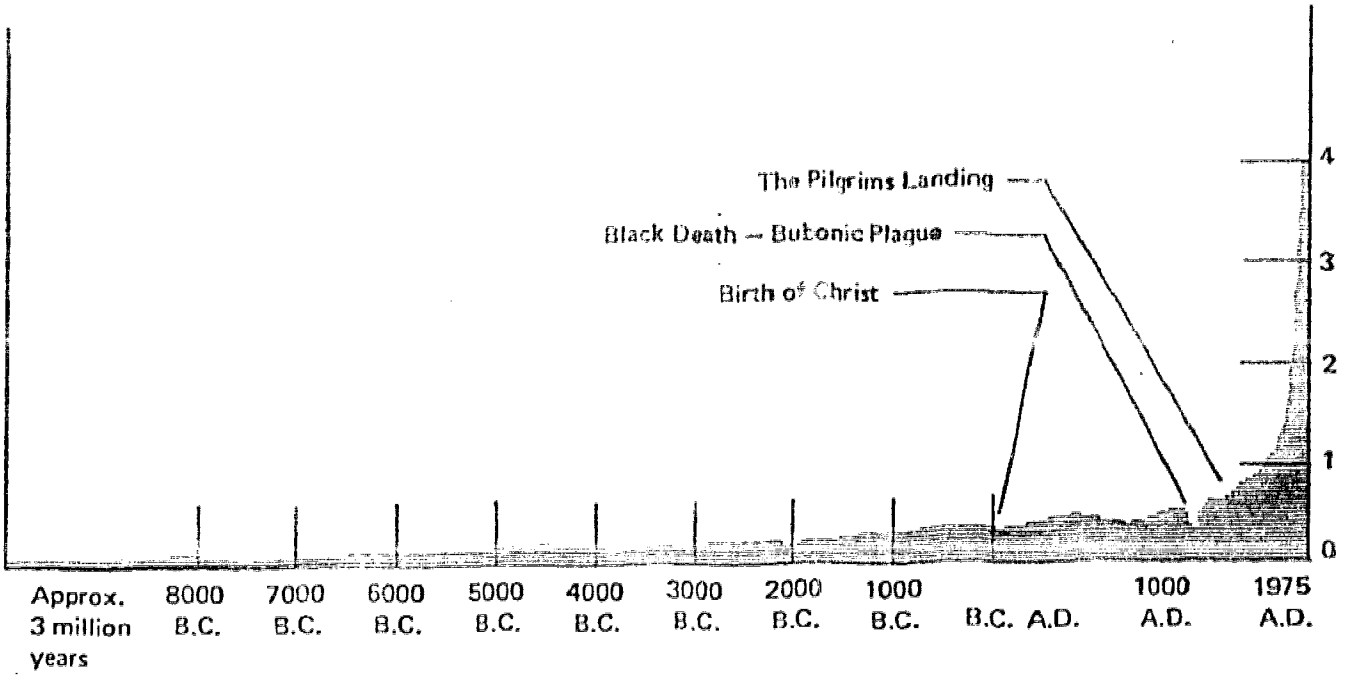
A. "Today, in human society, we can perhaps hope to survive in all our prized dirversity provided we can achieve an ultimate loyalty to our single, beautiful and vulnerable planet Earth."
Rene Dubois



B. "The growing population and expanding economy of Connecticut have had a profound impact upon the life sustaining natural environment. The air, water, land and other natural resources taken for granted since the settlement of Connecticut are now recognized as finite and precious."
Connecticut General Assembly, P. A. 872



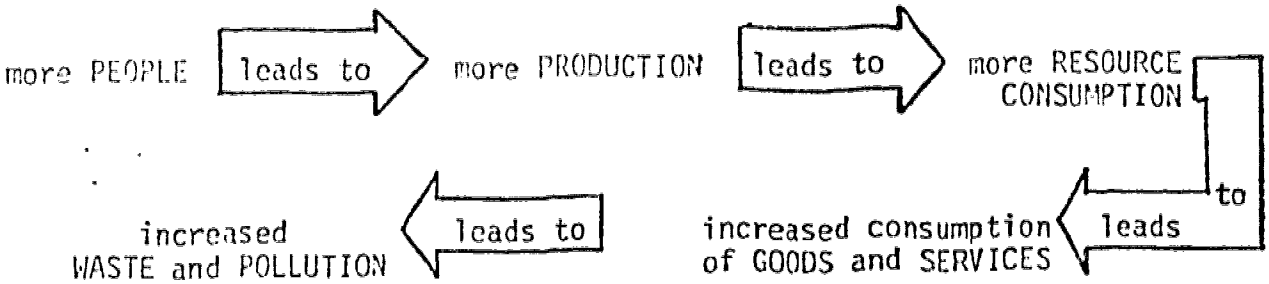
A. Historical Growth of the Human Population.



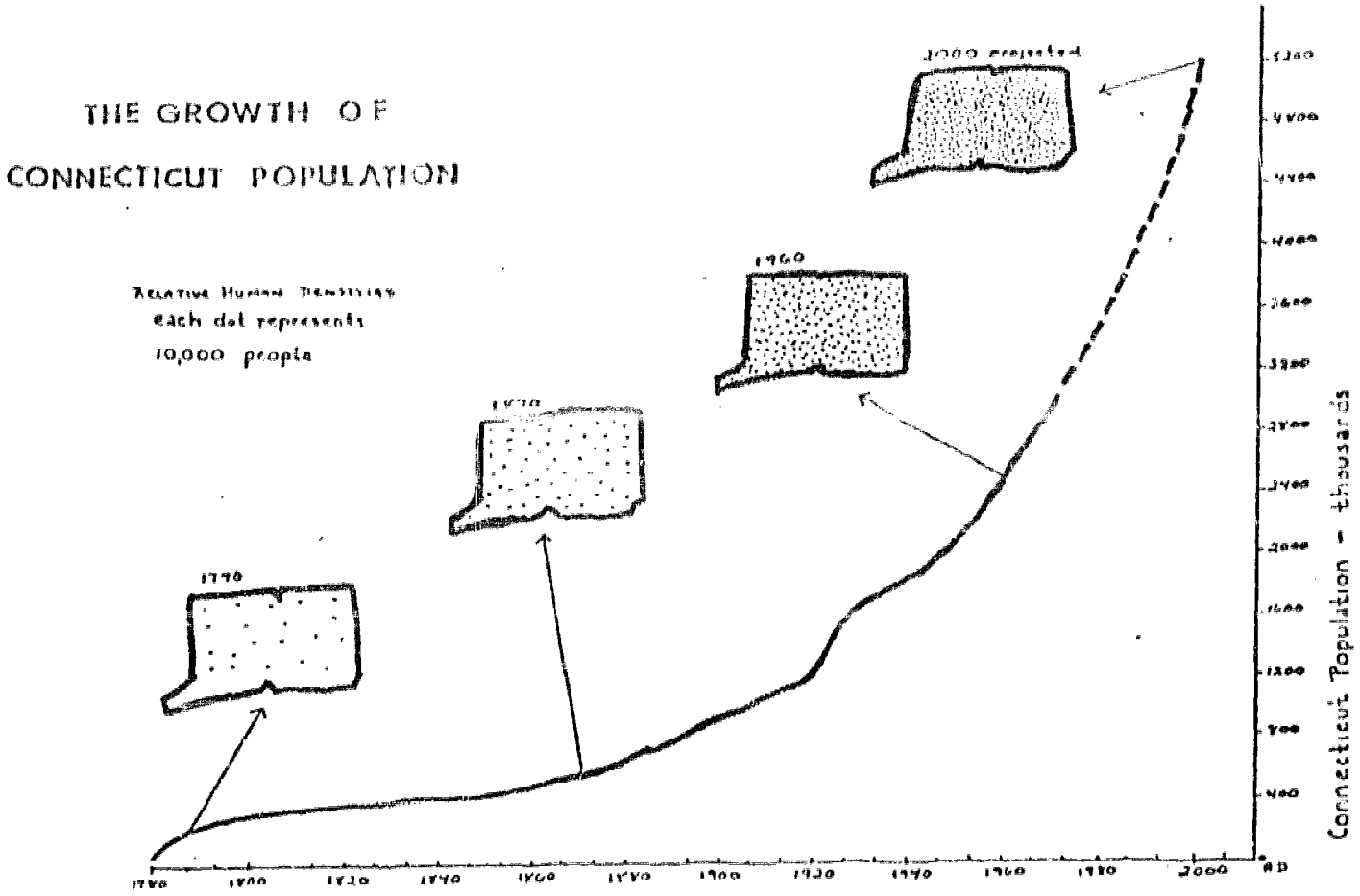
B. Population Size, Doubling Time, and Growth Rate from Historical Times to the Present.

Year	Population Size	Doubling Time (Yrs.)	Annual Growth Rate
3 million B.C.	415,000	–	–
400,000 B.C.	1 million	About 2,5 million	0.00003%
20,000 B.C.	2.2 million	About 400,000	0.0002%
6,000 B.C.	5 million	About 14,000	0.005%
1650 A.D.	500 million	–	0.3%
1850 A.D.	1,000 million	200	0.5%
1930 A.D.	2,000 million	80	0.8%
1975 A.D.	4,000 million	40	1.9%

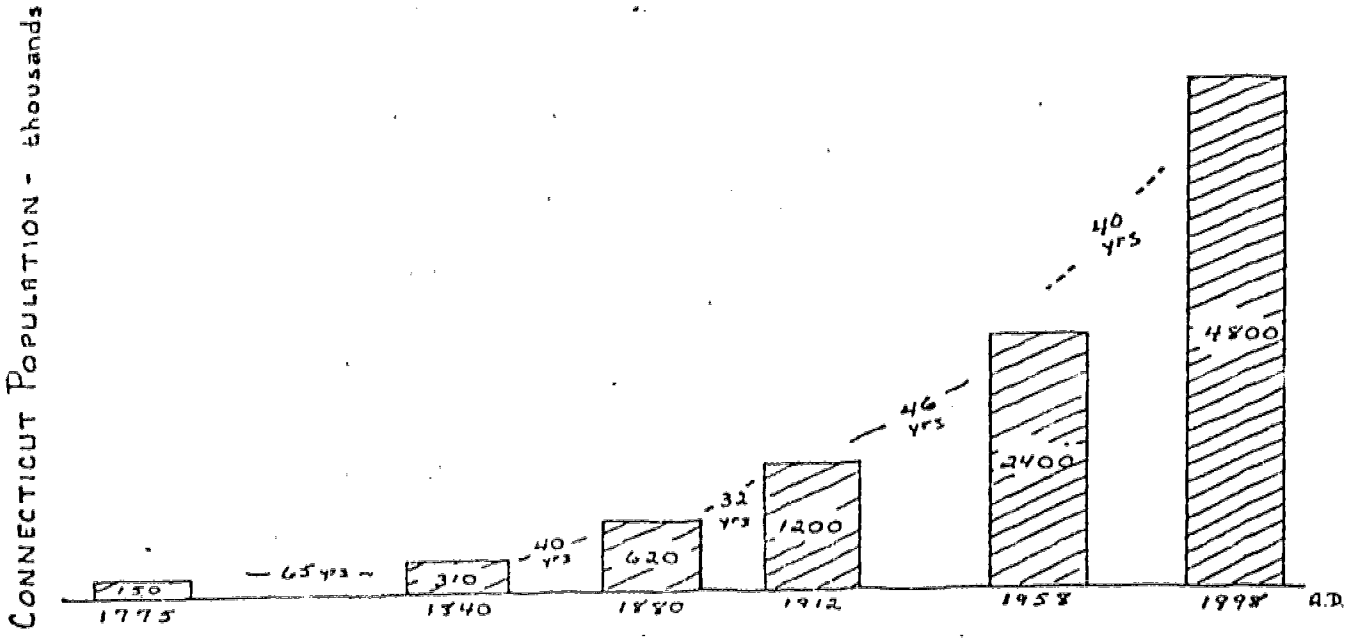
C. The relationship between Population Size, Resource Consumption and Pollution.



A. Illustrated Growth Chart of Connecticut's Population.



B. Acceleration of Connecticut's Population Growth as revealed by the shortening of its Doubling Time.



1970 Conn. population 3 milli
Doubling time 40 years

FACT SHEET ON CONNECTICUT'S POPULATION

POPULATION

Connecticut ranks 24th in the nation in population. It ranked 25th in the 1970 census. It is the only New England State to move in its rank in the new census.(5)

Connecticut has led all the northeastern states in population growth. "In 7 out of the last 8 decades the growth of Connecticut has been greater than the national average. In the last decade (1960-1970), the average per cent increase of the USA was 13.3% and of Connecticut 19.6%."(7)

Connecticut ranked 4th in the nation in population density in the 1970 census.(6)

In 1790 there were 49 people per square mile. This was 11 times the average USA density.(6)

In 1970 there were 624 people per square mile. This was 10.7 times the average USA density.(6)

By the year 2000 there are estimated to be 1000 people per square mile in Connecticut.(4)

ZERO POPULATION GROWTH?

The baby bulge of the late 40's is reaching its peak reproductive years. If trends of the past have meaning for the future, Connecticut's present population of 3 million will increase to 5 million by the year 2000.

If the newly married were simply to have two children to replace themselves, Connecticut's population would still increase by 30% to over four million by the year 2000, owing to the large number of women now approaching their prime child bearing age.

Natural growth is not the only means of Connecticut population growth. Net in-migration into Connecticut plays a large role also. Even with a zero natural population growth, the population would rise more than 25% by the net in-migration.(1)

OPEN SPACE

The greatest number of people in Connecticut live in the areas of least open space. Large volumes of open space exist in northeastern and northwestern Connecticut. These areas have the least dense population.(2)

Agriculture (wooded land, suburban lawns, flowers and trees, rocky ridge tops, lakes and rivers, swamps, marshes, shellfish grounds, and working farms) occupies 2 out of 3 million acres in Connecticut.(2)

HOUSING

There are 18,000 acres of blight (deteriorated, crowded, dirty, noisy conditions) in 68 of our 169 towns. More than 8% of all urban areas are blighted.(1)

WASTE DISPOSAL

The State Department of Health estimates that within five years half the towns in Connecticut will have used up all the land available for waste disposal.(1)

RECREATION

By the State's standards the minimum desirable acreage for recreation

should be 20 acres per 1000 persons. Already every type of recreation is below this level. The recreation demand is greater than the capacity of the state facilities in swimming, boating, fishing, camping, picnicking, hunting, hiking and golf. Even the parking demand greatly exceeds the capacity.(3)

TRANSPORTATION

Automobile registration will go from a current figure of 1.2 million to 2.5 million in the next 30 to 40 years.

Truck registration will shoot up from 146,000 to somewhere near 350,000 in the next 30 to 40 years.

By the year 2000:
total person trips for the state will almost double from 4.2 million miles to 7.5 million miles, 7 million of those miles within the state.
the average trip length will increase by 12%
the total vehicle miles will triple. (2)

POGO WAS RIGHT: "WE HAVE MET THE ENEMY AND THEY ARE US"

SOURCES

(1) Report of the Governor's Committee on Environmental Policy. "An Environmental Policy for Connecticut." State of Connecticut, June 1970.

(2) Connecticut Interregional Planning Program. "Connecticut: Choices for Action." State of Connecticut, 1967.

(3) Connecticut Interregional Planning Program. "Connecticut Tomorrow." State of Connecticut, 1966.

(4) Connecticut Development Commission. "Population: A Demographic Analysis of Connecticut 1790-2000." State of Connecticut, 1962.

(5) New Haven Register. December 1, 1970. 1970 U.S. census data.

(6) Data Book Social and Economic Statistics, U.S. Dept. of Commerce, 1973.

(7) Department of Finance and Control, Census 70, State of Connecticut, 1972.

March, 1972

Population Profile

POPULATION REFERENCE BUREAU, INC. • 1755 MASSACHUSETTS AVE., N.W., WASHINGTON, D. C. 20036 • (202) 232-2288

POPULATION STATISTICS: WHAT DO THEY MEAN?

An exchange of letters took place recently in the Portland (Oregon) Press between a local resident and a representative of the Portland chapter of Zero Population Growth, Inc. At one point in the exchange the citizen asked: "Shall we use ZPG's statistics or those I used from the Census Bureau...?" The ZPG man was quick to respond that he used Census Bureau statistics, too.

The episode is typical of the confusion that is generated when complex, controversial subjects are discussed in terms of numbers. Statistics are powerful weapons in a controversy; all too often they are used improperly, inaccurately, and even dishonestly. Those who wish to understand a subject, and to judge the merits of opposing views, must be able to spot the occasions when statistics are used incorrectly. Those who wish to take part in, or report on, a controversial subject have a further task: to make sure the numbers they quote are both accurate and appropriate to the point being made.

The major purpose of most population statistics is to describe how populations have changed and are changing, and--most difficult but also most interesting--how they will change in the future. Demographers have developed a number of measures to describe the behavior of populations. Each has advantages--and defects. This Profile outlines the most common measures of population dynamics, and indicates how they can most profitably be used.

There is another side to demographic statistics that, unless it is continually kept in mind, can also be misleading. That is the question of accuracy. Demographers are constantly aware that the numbers they use may not be very reliable, but sometimes laymen forget it. Even in advanced countries where statistics have been collected for many years, the accuracy of numbers that represent the behavior of millions of people often is open to question. And sometimes, especially for indicators based on sophisticated computations, available figures can be outdated.

POPULATION INDICATORS

A good way to illustrate both the quality of demographic data and some of the major demographic measures is to describe how one of the simplest figures--the total national population--is developed. The basic measures used for estimating total population come from the NATIONAL CENSUS. Most countries today--there are some notable exceptions including the world's most populous country, China--conduct population censuses on a fairly regular basis. Some censuses collect information on a broad range of subjects, while others are aimed simply at counting the number of people in the country at a given time.

If a national census involves a genuine effort to count every person, rather than just estimating populations on a regional basis, the most common error is likely to result from the fact that some people just didn't get counted.

The size of the undercount may be estimated by conducting a post-census survey in which a representative sample is asked whether they were counted during the census. The proportion of those sampled who had not been counted gives an estimate of the size of the undercount. In the 1960 U.S. Census, for example, the undercount was esti-

mated to be 3 percent, or almost 6 million people. The estimate of the 1970 census undercount has not yet been made by the Census Bureau.

A census gives more or less accurate estimate of the number of people in a country at one point in time. But censuses are taken too seldom to be satisfactory for many uses. Often, estimates are needed of the population at times between censuses.

One way of making such estimates is to use the INTERCENSAL GROWTH RATE. This figure is computed by subtracting the population figure of the previous census from that of the current census, which yields the intercensal population growth. In the United States, for example, the 1970 Census population was 203 million, and the 1960 population was 179 million.

$$\text{INTERCENSAL GROWTH} = [\text{1970 POPULATION}] - [\text{1960 POPULATION}]$$

This figure is converted to an average annual growth RATE by dividing it by the number of years between censuses (10 years in the case of the U.S.) and dividing the result by the total population of the earlier census year:

$$\text{AVERAGE ANNUAL GROWTH RATE} = \frac{\text{INTERCENSAL GROWTH}}{\text{YEARS BETWEEN CENSUSES}} \Big/ \text{EARLIER (1960) POPULATION}$$

$$= \frac{\text{24 MILLION}}{10} \Big/ \text{179 MILLION}$$

$$= \text{1.3 PERCENT PER YEAR}$$

The growth rate can be used to make a rough estimate of the population in the years between censuses. If the population had continued to grow at 1.3 percent per year through 1971, then the population for that year would be 1.3 percent greater than the 1970 figure, for a total of 207 million.

This estimate is based on a statistical projection of the 1970 population in which it is assumed that the population continued to grow at 1.3 percent. Most such projections of where a population is going are based on an assumption of this sort: that the rate of change will remain the same as it was when last measured (or that it will vary in a certain way). Rates can change unpredictably, however. A given rate is accurate only at the time it is measured. Any extension beyond that period, especially for more than a short time, is open to error.

Another way to estimate population between censuses involves the use of three other measures:

The CRUDE BIRTH RATE measures the number of babies born in one year for each 1,000 persons in the population at the midpoint of that same year:

$$\text{BIRTH RATE} = \frac{\text{NUMBER OF BIRTHS PER YEAR}}{\text{POPULATION}} \times 1000$$

Similarly, the CRUDE DEATH RATE is the number of deaths in one year per 1,000 population:

$$\text{DEATH RATE} = \frac{\text{NUMBER OF DEATHS PER YEAR}}{\text{POPULATION}} \times 1000$$

NET MIGRATION is the difference between the number of people who enter the country in one year (immigration) and the number who leave (emigration):

$$\text{NET MIGRATION} = \text{IMMIGRATION} - \text{EMIGRATION}$$

Net migration can be either positive, with more immigrants than emigrants, or negative, with more people leaving than entering.

All three of these measures are complicated and difficult to obtain, especially for the less developed countries. They require that up-to-date birth and death records be kept on the local level, and that the results be forwarded to a central authority for integration on a national basis. Even in the United States, it was not until 1933 that all the states joined the federal system of birth and death registration, and many countries still do not have national systems.

Still, even partial registration can be used to estimate birth and death rates, and together these two indicators give a measure of the NATURAL INCREASE of a country (excluding migration):

$$\text{RATE OF NATURAL INCREASE} = \frac{[\text{BIRTH RATE} - \text{DEATH RATE}]}{10}$$

Since birth and death rates are measured as so-many per 1,000 population, the difference is divided by 10 to yield increase per 100 population, or percent.

In the United States in 1970, the birth rate was 18 per 1,000, and the death rate was 9 per 1,000. That means that the rate of natural increase was (18-9)/10 = 0.9 percent.

Net migration can be converted to a "per-1,000" figure and added into the equation to yield the GROWTH RATE:

$$\text{GROWTH RATE} = \frac{\left[\text{BIRTH RATE} - \text{DEATH RATE}\right] + \frac{\text{NET MIGRATION}}{\text{POPULATION}} \times 1000}{10}$$

In the United States in 1970, net migration was 400,000, or 2 per 1,000 population. So the total growth rate was (18.9 + 2)/10 = 1.1 percent.

This figure can be compared with the average annual Intercensal Growth Rate computed earlier. That figure was 1.3 percent; so the annual population growth rate in the United States has dropped compared with the average rate during the 1960s.

For projections of population growth over more than a year or two, demographers like to have even more detailed indicators than births and deaths. Most of these measures depend on a knowledge of the AGE STRUCTURE of a population.

Age structure has significant effects on population growth. Basically, the rate of natural increase depends on two factors: the rate at which women in the reproductive age group are having babies, called FERTILITY, and the proportion of women who are in the child-bearing period of their lives. In the United States, for instance, the children born during the high-fertility years of the 1950s, more numerous than those born in the previous decade, will be entering the ranks of parents during the 1970s and 1980s. Even if fertility remains at its present low level, the number of babies born per 1,000 total population--the birth rate--is likely to be higher. Fertility would have to drop below present levels for the birth rate to remain unchanged.

Fertility is measured in several different ways. Each has advantages and disavantages, which makes it more or less useful in projecting future population growth.

GENERAL FERTILITY is the number of children born each year per 1,000 women in the reproductive age group (15 to 44 years in the United States). This measure takes the age structure into account to a certain extent, unlike the birth rate. In 1971 the general fertility rate was 82.3 births per 1,000 women. If general fertility stayed at that level for 30 years, the length of the reproductive cycle, that measure would correspond to 30X82.3=2469 births per 1,000 women, or 2.47 births per woman. But that is a highly artificial measure, since it assumes constant fertility and does not reflect changes in the age structure. For this reason, while the general fertility rate is used to measure changes in current fertility, other indicators are computed to reflect longer term fertility trends.

The AGE SPECIFIC FERTILITY RATE eliminates the effect of age structure entirely; it is the number of births per year to 1,000 women of a particular age. It can be computed (if the data are available) for each single year of age during the reproductive years, but it is usually computed for five-year age groups: women 15-19 years old, 20-24 years, 25-29 years, and so on.

The TOTAL FERTILITY RATE is based on age-specific rates. It measures the total number of children 1,000 women would have if they passed through their reproductive years with the age-specific fertility of a particular year. For example, in 1968 the fertility rate for women aged 15-19 years in the U.S. was 66 births per 1,000; for women aged 20-24 it was 167, and for women aged 25-29 it was 140.

To compute the total fertility rate for 1968, a demographer would assume that 1,000 women would have 66 births per year between the times when they were 15 and 19, 167 births per year between the ages 20 to 24, 140 births per year between ages 25 and 29, and so on, corresponding to the fertility rates that existed for each age group in that one year, 1968.

Naturally, no group of 1,000 women is going to experience exactly the fertility pattern assumed in computing the total fertility rate. Age-specific fertility is likely to change over the 30 years required for a group of women to pass through their fertile period. So the total fertility rate is hypothetical: It is another of those measures that need the warning phrase: "If present rates continue".

There is a fertility measure that, unlike the total fertility rate, measures the number of children a group of 1,000 women have actually had. That is called the COMPLETED FERTILITY RATE. It measures the total number of children born to women who reach the end of their reproductive cycle in the year the measure is taken. In the United States in 1968, the completed fertility rate for women aged 44 was 2.7 per 1,000 women.

At first glance it might seem that completed fertility would be a much more reliable indicator than the unreal figure represented by the total fertility rate. The difficulty is that most children are born to women in their 20s; so the completed fertility figure measures the child-bearing behavior of women who had most of their children 20 years earlier. This makes it much less useful for estimating what fertility behavior is like at present, or is going to be like in the future.

ZERO GROWTH—THE REPLACEMENT LEVEL

Much of the discussion going on about population today is concerned with the question of population growth, and especially on the question of zero population growth. Using the indicators described in the previous section, what can be said about halting population growth in this country?

Some recent reports, drawing on declines in the birth rate and in fertility, suggest that zero population growth might be just around the corner. But a further look at the statistics, in the light of their limitations, shows that this possibility is remote.

What is zero growth? Basically, it is a condition under which the birth rate is equal to the death rate (ignoring the effects of net migration).

Obviously, with the current 1971 birth rate at 17 per 1,000 and the death rate at 9 per 1,000, the country is nowhere near ZPG. Its rate of natural increase is 8 per 1,000 or 0.8 percent per year, a net increase in the U.S. population of about 1.7 million people per year. In fact, as far as is known, birth rates have never declined to close to the level of the death rate in the United States, even during the low fertility period of the 1930s.

But birth and death rates, although they accurately reflect present population conditions, are poor predictors of the future. This is because they are so sensitive to variations in the age structure, and because fertility behavior can change rapidly.

Replacement Level of Fertility

So the next step is to look at fertility rates. Demographers have calculated that if women have a completed fertility rate of 2.11 children, there will be enough births to replace the parents and compensate for premature deaths. This figure, 2.11, is called the REPLACEMENT LEVEL of fertility.

Completed fertility for the cohort of women who came out of their childbearing years in 1970s (born 1925-1929) will be over 3. Quite clearly, this cohort was nowhere near the replacement level of fertility. But it has already been noted that the completed fertility applies to women who were doing most of their childbearing 15 or 20 years earlier. It can tell what fertility behavior was in the past, but it is not very informative about present fertility behavior, and almost useless in projecting future behavior.

The measure of total fertility would seem to be more useful, since it deals with current fertility patterns. In computing total fertility, it is assumed that women just entering the reproductive years will follow the age specific fertility pattern for a given year. If this age specific pattern remains the same throughout the 30 years of their reproductive cycle, these women would have a completed fertility equal to the total fertility that was computed for that given year.

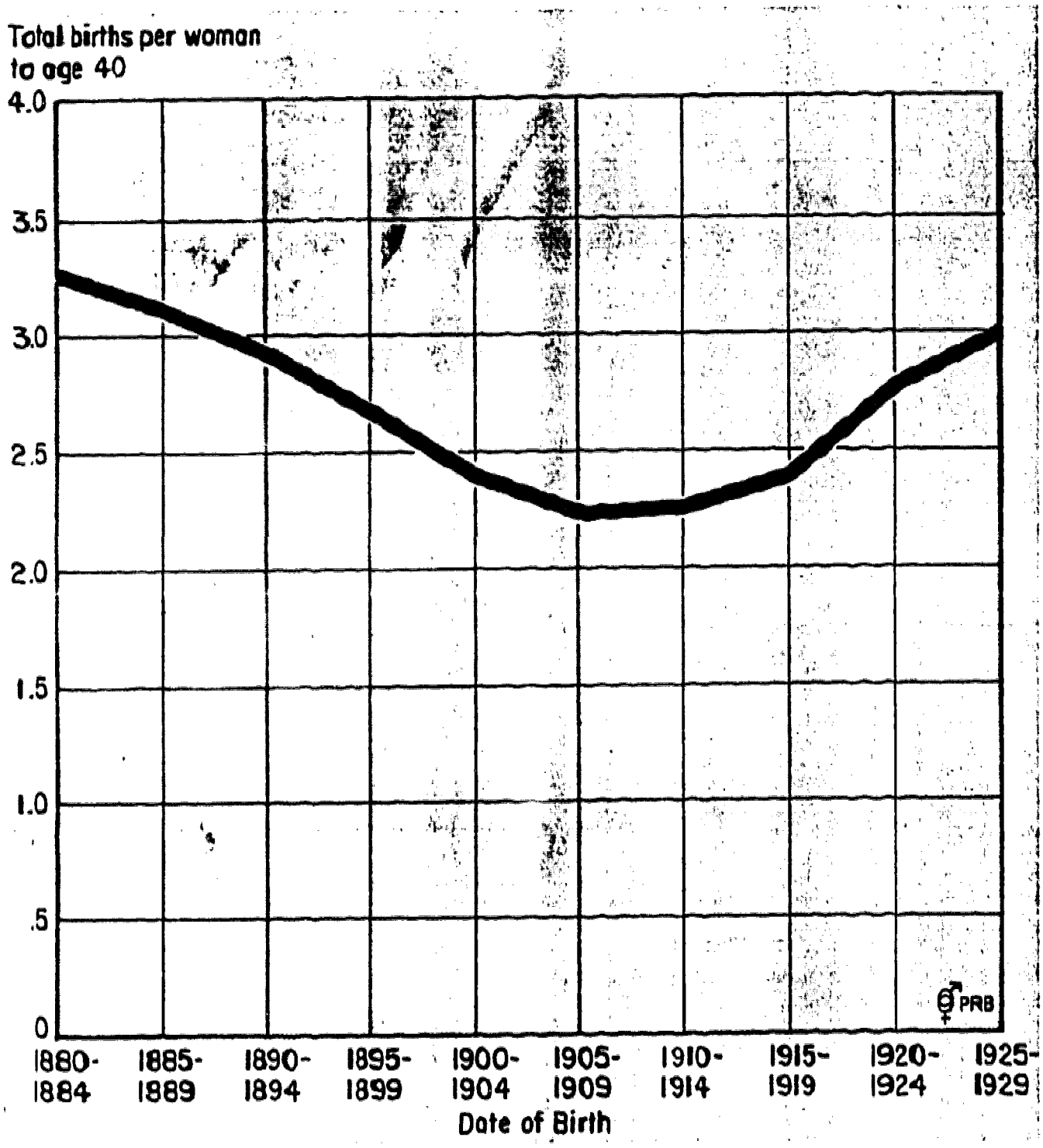
In 1968, the total fertility rate was 2.5. Provisional figures for 1969 and 1970—based on 1968 age specific fertility rates—are 2.4 and 2.5. In 1957, at the height of the baby boom, the total fertility rate was 3.7. Looking at this decline, there is a temptation to say that fertility is close to the replacement level of 2.11—particularly since general fertility dropped in 1971.

But there are two reasons for resisting this temptation. In the first place, total fertility is only hypothetical. It is based on the assumption that fertility will remain unchanged for 30 years. But age-specific fertility could go up during that period; it could go down. Age at marriage could change; so could the spacing of children born. It could increase at the higher age levels and decrease at the younger ages, or vice-versa. Fertility behavior is so greatly influenced by complex social, economic and psychological factors that predicting its future course is extremely chancy.

The other reason for hesitancy is that the total fertility rate is out of date. For several reasons, particularly budgetary ones, the National Center for Health Statistics has fallen behind in computing data on age-specific fertility, so that the latest available figures are for 1968 (with provisional 1969 and 1970 figures). The lag in this important indicator is particularly unfortunate because of the controversy currently surrounding population questions.

The general fertility rate, the number of children born each year per 1,000 reproductive-age women is more current: The provisional figure for 1971, 82.3, has already been published. General fertility, as has been shown, is a better indicator of childbearing activity than the birth rate, because it takes the age structure into account. But if total fertility is a chancy tool for estimating fu-

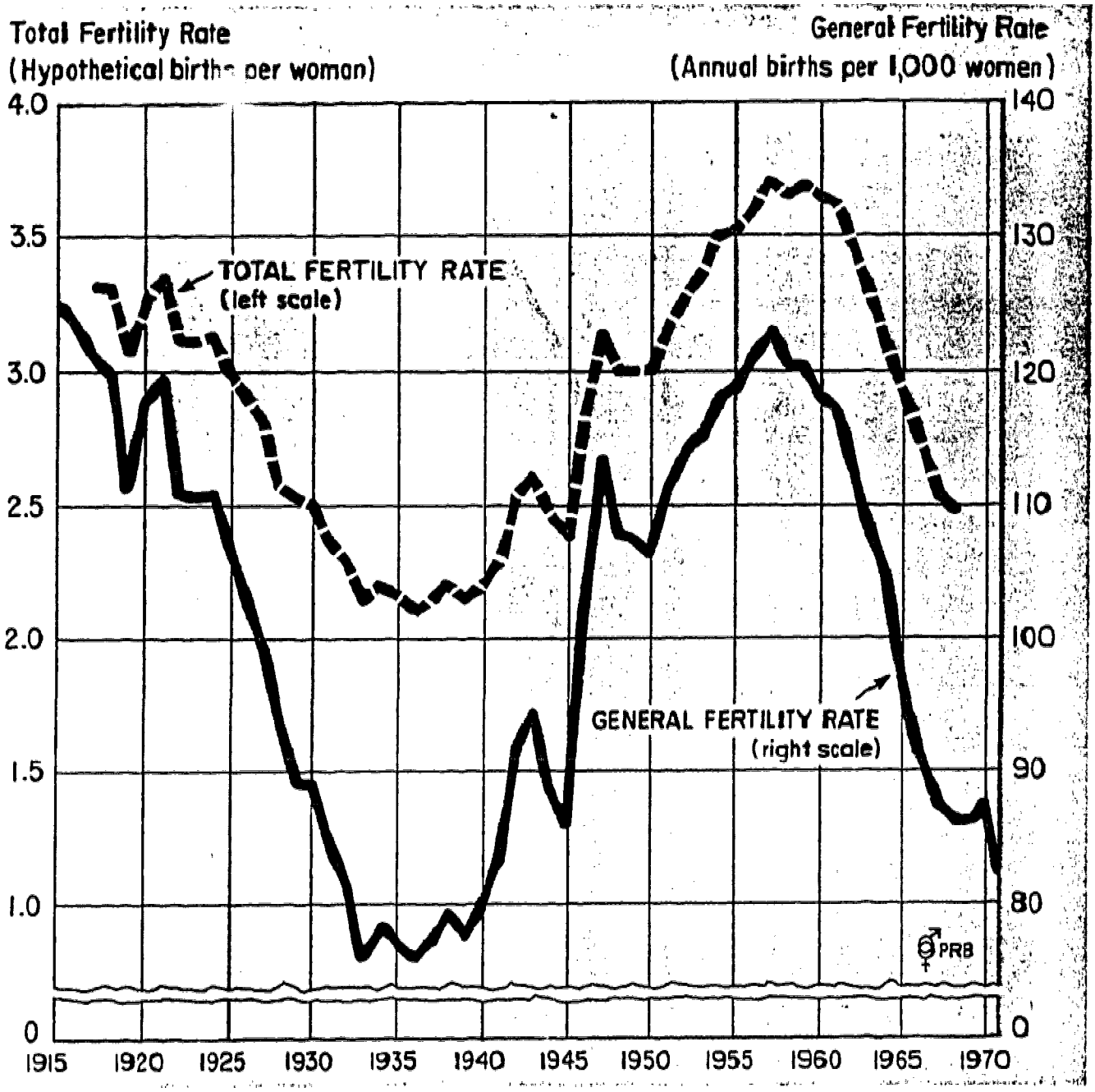
CHILDREN EVER BORN TO AGE 40, FOR WOMEN BORN 1880-1929



Source: National Center for Health Statistics

Completed Fertility decreased for women who did most of their childbearing in the 1930s, increased for post-World-War II mothers.

TOTAL FERTILITY AND GENERAL FERTILITY, 1915-1971



Source: National Center for Health Statistics

The decrease in fertility since the baby boom peak of 1957 parallels the earlier decline of the 1920s and early 1930s.

ture population trends, the general fertility rate is even more unreliable.

U.S. POPULATION—WHERE IT'S AT

The previous section was concerned with the limitations on what can be gleaned from population statistics. The general conclusion was that it is impossible to say with certainty at this time how close fertility is to the replacement level, and most unwise to predict when replacement will be reached. It is even less advisable to predict how soon population growth will end.

But some conclusions can indeed be drawn about current fertility behavior, based on data available. At the least, what is known about the

present can be compared with the fuller details that have been collected for earlier periods.

Completed fertility measures the childbearing behavior of women coming out of their reproductive years. The most convenient figure to use is the total number of children born to women up to the age of 40, since few children are born beyond that age. The curve shows that women who were born in 1885 to 1889, and who were at peak fertility just before World War I, were averaging more than three births each by age 40. Twenty years later, in the 1930's, women in their peak fertility years were bearing fewer children: The average fertility by age 40 for this group was a little more than two births per woman. Early in the 1950s, fertility was up again; the group that was in its 20s in those years reached an average of three births per woman at age 40.

The trend traced by the completed fertility curve is also reflected in the total fertility indicator, which was higher than three children per woman in the early 1920s, dipped to 2.2 children in the late 1930s, and rose to 3.7 children in the late 1950s. Since then, the total fertility rate shows a decline; in 1968, the latest figure available, it was 2.48 children per woman.

The general fertility rate similarly reflects these changes. In the early 1920s it was well above 100 births per 1,000 women in the reproductive age groups. It fell below 80 during the 1930s, then rose to a peak of 121 in the late 1950s. Since then it has decreased, reaching 82.3 in 1971.

These trends show that fertility has declined dramatically in the 14 years since general fertility peaked in 1957. But a look at history shows that the decline was equally dramatic in the 12 years from 1921 to 1933. General fertility has not yet reached the low point of the 1930s, when it remained below 80 per 1,000 for eight years.

What about replacement fertility and zero population growth? The total fertility rate for the low years of the 1930s was very close to the replacement level. Despite these low levels, however, the country was never close to zero population growth. The baby boom that took place in the 1940s and 1950s, and continued well into the 1960s, sent the population growth rate up a steep incline.

Nor is the country close to zero growth today. Fertility has not fallen to the levels of the 1930s; even if it does, it will take many years of sustained low fertility to overcome the effects of the relatively large number of people now entering the reproductive period of their lives.

POPULATION PROJECTIONS

The decline in fertility since the late 1950s has not been ignored by those attempting to predict future U.S. population trends. Rapid changes in fertility place a heavy burden on the economy and on the society. The sharp increase in childbearing during the baby boom years put a severe strain on schools, once these children reached their sixth year; likewise, a substantial decrease in the young age groups would require adjustments in education, health and other services.

As a result, there has been much controversy over the significance of the fertility decline of the 1960s, accompanied by some dubious manipulation of population statistics on the part of a few participants. One highly publicized report by a private research firm extended the current fertility decline downward through the 1970s and announced that the nation was in danger of "Instant ZPG"—vaguely defined as zero growth within a decade or a few decades.

Warnings of this kind are contradicted by the population projections released by the U.S. Census Bureau. Their main technique in making projections—the current series includes four, labeled Series B, C,D and E—is to assume that fertility will follow various paths, and to compute how population will change, given the present age structure, certain factors of mortality and immigration levels. Series B, the highest fertility assumption, is based on a level of 3.1 children per woman; Series E, the lowest, assumes that fertility will decline gradually to reach replacement, 2.11, in the year 2000. Another Series, labelled X, is the same as Series E but assumes that net immigration will be zero.

Under Series X assumptions, zero growth would not be reached until the year 2037, at which time U.S. population would be 276 million, 67 million greater than at present.

Below Replacement Fertility

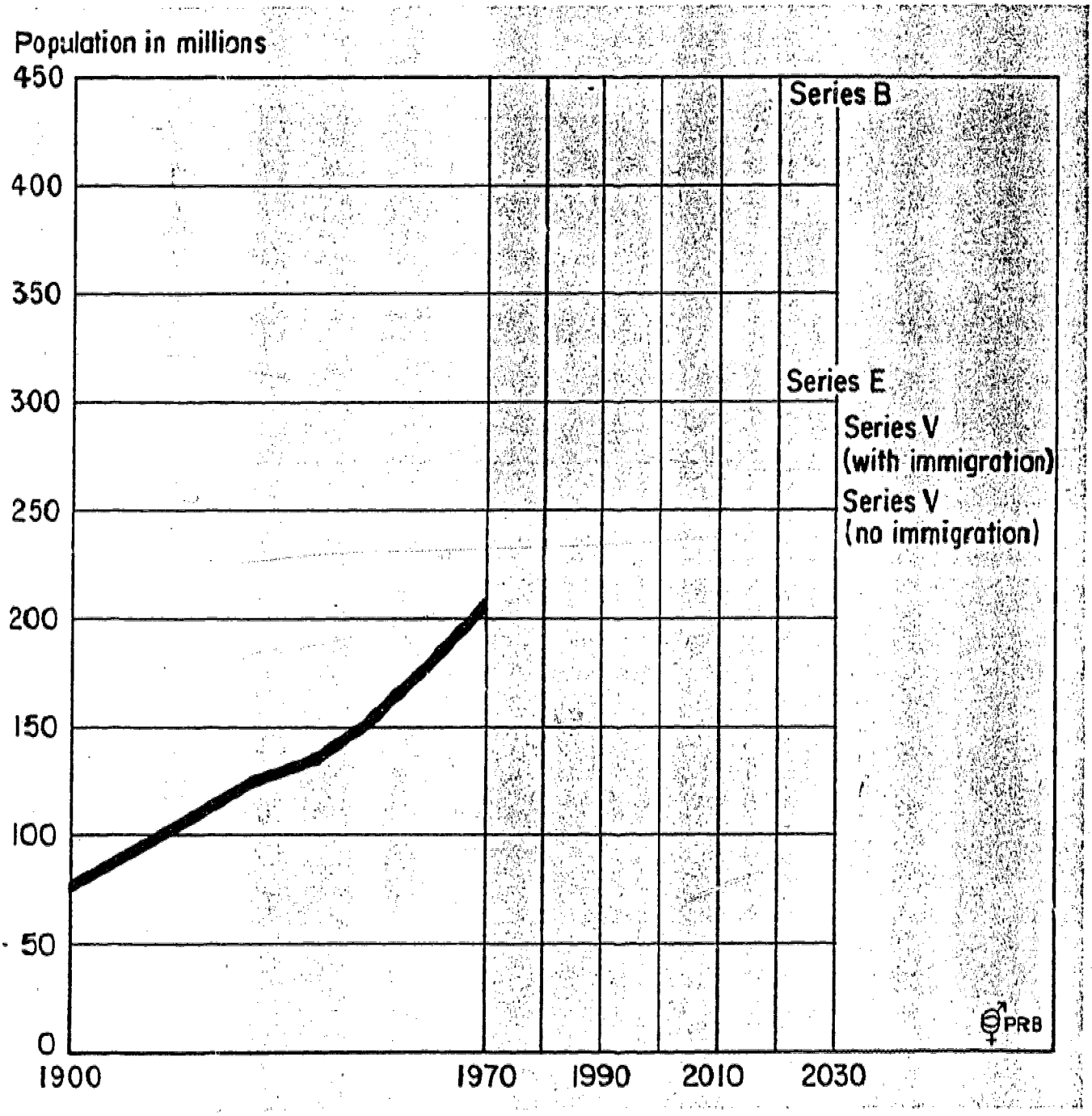
What if fertility dropped below replacement? Such fertility behavior has never happened before, but there is nothing to prevent such an event, and there are a number of forces, including better contraceptives, easier access to abortion, economic

factors, and environmental concerns, that could push it down.

In response to such speculation the Census Bureau has issued a new series of "illustrative" projections with lower fertility assumptions than Series E. There are 12 projections in the new series, six assuming no net immigration, and six assuming an annual net immigration of 400,000 (the same as for Series B through E).

The Census Bureau has not issued these new projections as a substitute for the Series B-through-E curves. Rather, they are illustrations of what could be expected under what seem to be rather unrealistic assumptions (although some of them

PROJECTED POPULATION GROWTH, VARYING FERTILITY ASSUMPTIONS, TO 2030



Source: U.S. Bureau of the Census

Even if fertility drops well below replacement, as in the Census Bureau's Series V projection, population growth will continue well into the 21st century.

would appear to be more realistic than the Series B projection, with its assumption of a fertility of 3.1 children).

Two of the new projections, Series T and Series W, assume that fertility will drop to replacement by 1980 and 1970 respectively. Series V assumes that fertility will continue its downward course to reach a level of 1.5 by 1980, and then increase to reach replacement by the year 2000.

These projections show that even if fertility continues to decrease considerably below replacement, as in Series V, population growth would continue well into the 21st century, although it would have slowed substantially by the year 2000. Assuming no net immigration, population under Series V assumptions would be 240 million in 2000, and 254 million in 2030. With annual net immigration of 400,000, population would be 255 million by the year 2000 and 287 million by 2030, according to the Series V projection.

CONCLUSION

The future course of population growth is vitally important to the economic and social well-being of America. Providing public services such as schools and health care; predicting future markets for everything from toys to automobiles and housing; planning for urban growth—all these activities are affected by how many people there are, and how many there will be.

But projecting future population, as this Profile shows, is not an easy task. The spread between the Census Bureau's Series B projection and its "illustrative" Series V curve is almost 100 million people by the year 2000--less than 30 years in the future. The spread becomes almost 200 million --close to the present total U.S. population ---by the year 2020. Both of these extreme projections are unlikely, but neither is unreasonable. And their reasonableness makes the planning task of those responsible for preparing for the future much harder.

The projections prepared by the Census Bureau, and the analysis presented here, show one fact: that the threat of "Instant ZPG" is a remote one. Population growth is extremely likely to continue for many years, even if fertility rates remain at present levels or drop even further.

At the same time, there is strong evidence that population growth is likely to come to an end in the future, perhaps within the lifetime of many of those being born today. Although there will be many adjustments to be made in the economy and the society as a result of this trend, there will be time to adjust to them. And there are also many benefits to be derived from a reduction in population growth.

As the Commission on Population Growth and the American Future put it in its final report of March, 1972:

"The nation should welcome and plan for a stabilized population."

READINGS IN POPULATION

Brown, Harrison and Edward Hutchings, Jr. Are our Descendants Doomed? New York: The Viking Press, 1972. 377 pp. $12.50.

Twelve papers presented at a California Institute of Technology Conference on the impact of technological change on the growth and concentration of human populations, discussing religious and cultural aspects of population control, developments in contraceptive research, UN's role in population/family planning programs, historical changes in the balance of births and deaths, and the relationship of economic development to population growth and environmental change.

Brubaker, Sterling. To Live on Earth: Man and His Environment in Perspective. Baltimore: The Johns Hopkins Press, 1972. 202 pp. $6.95.

A text on the impact of economic, technological and demographic growth on the environment, discussing areas of concern, future prospects, options and possible solutions.

Brunn, Stanley D. Urbanization in Developing Countries: An International Bibliography. East Lansing: Latin American Studies Center and The Center for Urban Affairs, Michigan State University, 1971, 693 pp. $8.00.

Over 7,000 multilingual, bibliographic entries on political, social, economic, health, planning and community development and housing aspects of urbanization in Africa, Asia and Latin America. The material is listed by region, subregion and country, and includes a subject index.

Commission on Population Growth and the American Future. Population and the American Future. New York: New American Library, 1972. 362 pp. $1.50.

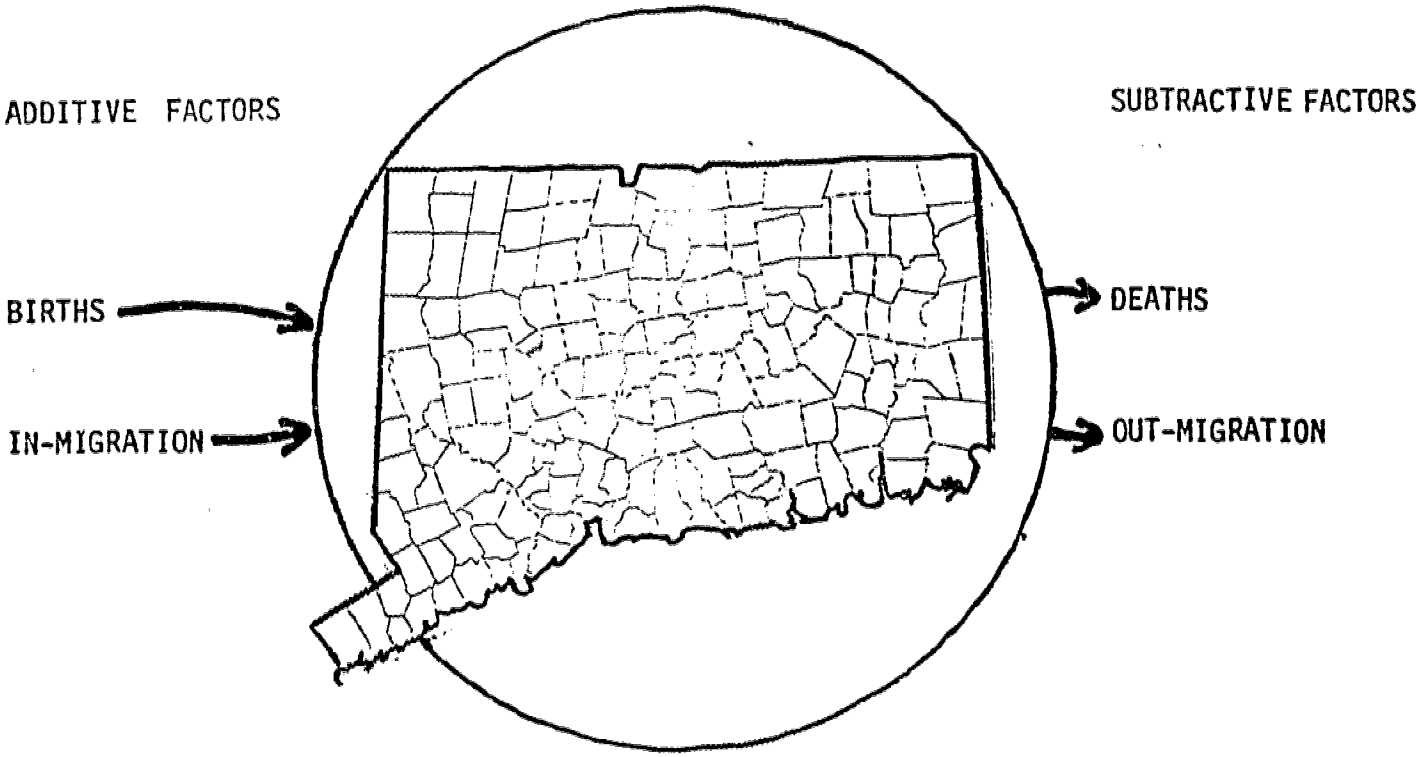
A paperback advance release of the report of the historic Commission's two-year study on the economic social and environmental implications of US population growth. Included are all dissenting statements by individual Commission members, references and lists of the more than 100 commissioned research papers and witnesses in national public hearings.

Lee, Luke T. and Arthur Larson, Eds. Population and Law. Durham, North Carolina: Rule of Law Press, 1971. 452 pp. $19.38. Twelve structured surveys and evaluation of legislation affecting population, dealing with birth control, family planning education and services, marriage, divorce and economic factors related to family, in Asia, the Middle East and Europe; also describes the activities of the United Nations and other international agencies in the field of population.

Petersen, William, Ed. Readings in Population. New York: The Macmillan Company, 1972. 483 pp.$5.95.
Forty selections by experts in their respective fields on various demographic topics, including population growth, theories, age and sex, classification of residence, urbanization, migration, health and mortality, fertility and population policy.

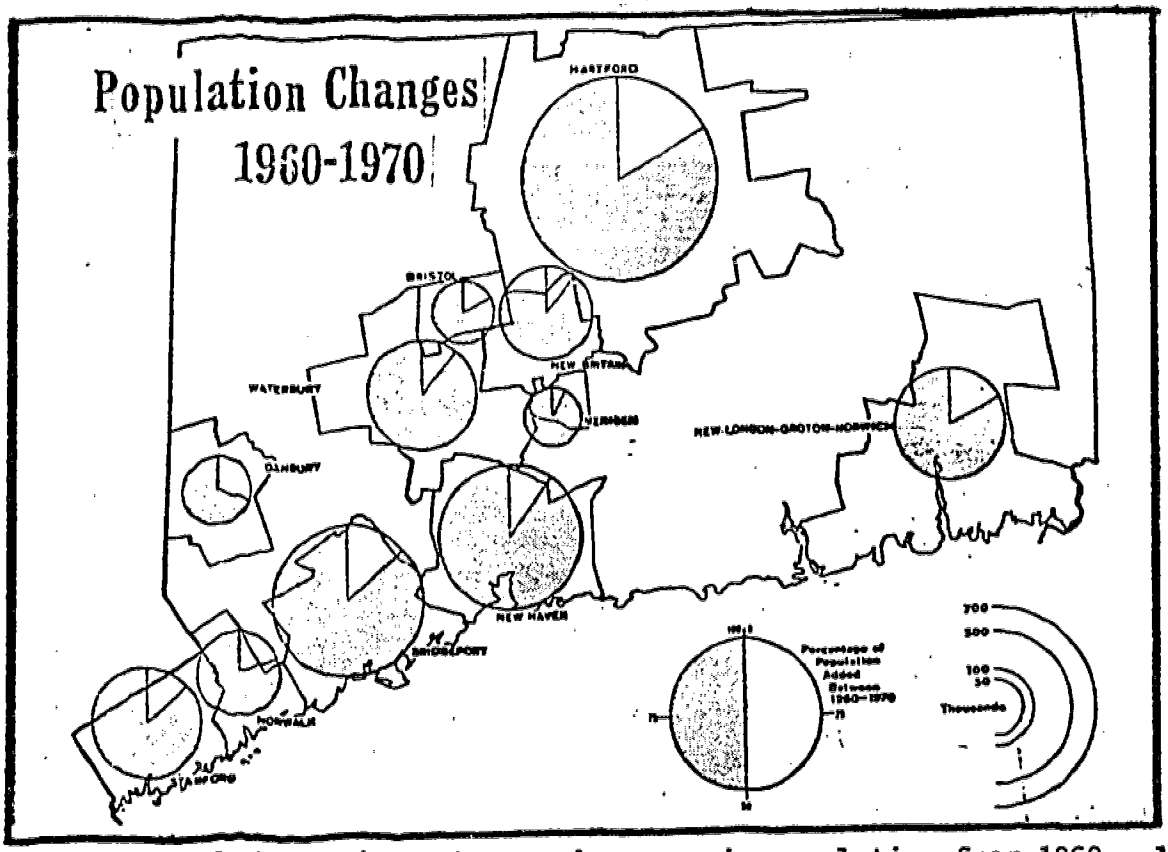
Shryock, Henry S. and Jacob S. Siegel. The Methods and Materials of Demography. Washington, D.C.: U.S. Government Printing Office, 1972. 959 pp. $7.00.
A two-volume work designed as a text for courses on demographic methods, and as a research tool for the professional, giving information on population data gathering techniques, classification, tabulation and summarizing measures used to reveal population dynamics and composition, with special emphasis on statistics available for underdeveloped nations and applicable methodology for these areas.

PART A. FACTORS INFLUENCING POPULATION CHANGE IN CONNECTICUT



PART B. FORMULAS FOR COMPUTING ADDITIVE AND SUBTRACTIVE POPULATION FACTORS.

	WORD FORMULA	LETTER FORMULA
BIRTH RATE =	$\frac{\text{NUMBER OF BIRTHS PER YEAR}}{\text{POPULATION}} \times 1000$	$BR = \frac{B}{P} \times 1000$
DEATH RATE =	$\frac{\text{NUMBER OF DEATHS PER YEAR}}{\text{POPULATION}} \times 1000$	$DR = \frac{D}{P} \times 1000$
NET MIGRATION =	IN-MIGRATION - OUT-MIGRATION	NM = IN - OM
RATE OF NATURAL INCREASE =	$\frac{\text{BIRTH RATE} - \text{DEATH RATE}}{10}$	$RNI = \frac{BR - DR}{10}$
GROWTH RATE =	$\frac{\text{BIRTH RATE} - \text{DEATH RATE} + \frac{\text{NET MIGRATION}}{\text{POPULATION}} \times 1000}{10}$	$GR = \frac{BR - DR + \frac{NM}{P} \times 1000}{10}$



1. Did all of the regions show an increase in population from 1960 - 1970?

2. Which regions had the largest percentage growth? the least percentage growth?

Table 1 - Population Size: 1920-1970

	1920	1930	1940	1950	1960	1970
CONNECTICUT	1364017	1606903	1709242	2007280	2535234	3032217
ANSONIA	17643	19898	19210	18706	19819	21160
BEACON FALLS	1593	1693	1756	2067	2886	3546
BETHANY	411	480	706	1318	2384	3857
BRANFORD	6627	7022	8060	10944	16610	20444
CHESHIRE	2855	3263	4352	6295	13383	19051
DERBY	11238	10788	10287	10259	12132	12599
EAST HAVEN	3520	7815	9094	12212	21388	25120
GUILFORD	2803	3117	3544	5092	7913	12033
HAMDEN	8611	19020	23373	29715	41056	49357
MADISON	1857	1918	2245	3078	4567	9768
GROTON	9227	10770	10910	21896	29937	38244
LEBANON	1343	1436	1467	1654	2434	3804
LEDYARD	1161	1144	1426	1749	5395	14837
LISBON	867	1097	1131	1282	2019	2808
LYME	674	546	717	857	1183	1484
MERIDEN	34764	38481	39494	44088	51850	55959
MIDDLEBURY	1067	1449	2173	3318	4785	5542
MILFORD	10193	12660	16439	26870	41662	50858
NAUGATUCK	15051	14315	15388	17455	19511	23034
NEW HAVEN	162537	162655	160605	164443	152048	137707
MIDDLEFIELD	1047	1204	1230	1983	3255	4132
MIDDLETOWN	22129	24554	26495	29711	33250	36924
OLD SAYBROOK	1463	1643	1985	2499	5274	8468
PORTLAND	3644	3930	4321	5186	7496	8812
WESTBROOK	849	1037	1159	1549	2399	3820

1. For the city of Ansonia, what was the population increase between 1920 and 1970?

2. What was the average population increase per year between 1920 and 1970 for Ansonia

You will find the answers to this exercise at the bottom of guide sheet # 9. Turn the recorder on after you have checked your answers.

GUIDE SHEET # 9

Table - Average Annual Growth Rates : 1920-1970

	1920-1930	1930-1940	1940-1950	1950-1960	1960-1970
CONNECTICUT	1.68	0.64	1.64	2.37	1.77
ANSONIA	1.21	-0.35	-0.27	0.58	0.66
BEACON FALLS	0.61	0.37	1.64	3.39	2.08
BETHANY	1.56	3.93	6.44	6.11	4.93
BRANFORD	0.58	1.39	3.11	4.26	2.10
CHESHIRE	1.34	2.92	3.76	7.83	3.59
DERBY	-0.41	-0.47	-0.03	1.69	0.38
EAST HAVEN	0.30	1.53	2.99	5.76	1.62
GUILFORD	1.07	1.29	3.69	4.51	4.28
HAMDEN	0.25	2.08	2.43	3.29	1.86
MADISON	0.32	1.59	3.21	4.02	7.90
GROTON	1.56	0.13	7.21	3.18	2.48
LEBANON	0.67	0.21	1.21	3.94	4.57
LEDYARD	-0.15	2.23	2.06	11.92	10.65
LISBON	2.38	0.31	1.26	4.65	3.35
LYME	-2.08	2.76	1.80	3.28	2.29
MERIDEN	1.02	0.26	1.11	1.63	0.77
MIDDLEBURY	3.11	4.14	4.32	3.73	1.49
MILFORD	2.19	2.65	5.04	4.48	2.01
NAUGATUCK	-0.50	0.73	1.27	1.12	1.67
NEW HAVEN	0.01	-0.13	0.24	-0.78	-0.99
MIDDLEFIELD	1.41	0.21	4.89	5.08	2.41
MIDDLETOWN	1.05	0.76	1.15	1.13	1.05
OLD SAYBROOK	1.17	1.91	2.33	7.75	4.85
PORTLAND	0.76	0.95	1.84	3.75	1.63
WESTBROOK	2.02	1.12	2.94	4.47	4.76

1. Has Connecticut's growth rate been even in each decade between 1920 and 1970? Which periods had the highest growth rate and which the lowest growth rate?
2. What events in American History coincided with the period of slowest growth and most rapid growth?
3. Did the individual cities or towns follow the same pattern of changes in growth rate as the state?
4. Which cities or towns exhibited the lowest and highest growth rate between 1940 - 1950?
5. Does the city or town with the highest growth rate between 1940 - 1950, still maintain the highest growth rate in 1960 - 1970 period?

Answers to Guide Sheet # 7 part B

1. $P_{1970} - P_{1920}$ = Population increase

   21,160 - 17,643 = 3,517

2. $\frac{\text{Population increase}}{\text{number of years}}$ = population increase per year

   $\frac{3,517}{1970 - 1920} = \frac{3,517}{50 \text{ yrs}} = 70.3$ persons/year

GUIDE SHEET # 10

Table . - Components of Population Change: 1960-1970

	Population Change 1960-1970		Sources of Population Change, 1960-70		Percent of 1960-1970 Change Due to:	
	Number	Percent	Natural Increase	Net Migration	Natural Increase	Net Migration
CONNECTICUT	496983	19.6	280962	216019	56.5	43.5
ANSONIA	1341	6.8	1778	-437	132.6	-32.6
BEACON FALLS	660	22.9	440	220	66.7	33.3
BETHANY	1473	61.8	367	1106	24.9	75.1
BRANFORD	3834	23.1	1977	1857	51.6	48.4
CHESHIRE	5668	42.4	1696	3972	29.9	70.1
DERBY	467	3.8	1017	-550	217.8	-117.8
EAST HAVEN	3732	17.4	2474	1258	66.3	33.7
GUILFORD	4120	52.1	1063	3057	25.8	74.2
HAMDEN	8301	20.2	2206	6095	26.6	73.4
MADISON	5201	113.9	467	4734	9.0	91.0
GROTON	8307	27.7	7927	380	95.4	4.6
LEBANON	1370	56.3	414	956	30.2	69.8
LEDYARD	9442	175.0	2244	7198	23.8	76.2
LISBON	789	39.1	318	471	40.3	59.7
LYME	301	25.4	47	254	15.6	84.4
MERIDEN	4109	7.9	5303	-1196	129.1	-29.1
MIDDLEBURY	757	15.8	274	483	36.2	63.8
MILFORD	9196	22.1	5061	4135	55.0	45.0
NAUGATUCK	3523	18.1	1982	1541	56.3	43.7
NEW HAVEN	-14341	-9.4	13705	-28046	-95.6	195.6
MIDDLEFIELD	877	26.9	492	385	56.1	43.9
MIDDLETOWN	3674	11.0	3722	-48	101.3	-1.3
OLD SAYBROOK	3194	60.6	676	2518	21.2	78.8
PORTLAND	1314	17.6	868	448	66.0	34.0
WESTBROOK	1421	59.2	359	1062	25.3	74.7

ANSWERS TO GUIDE SHEET # 9

1. The growth rate has varied with time.

   highest growth rate = 1950 - 1960
   lowest growth rate = 1930 - 1940

2. slowest growth - 1930 - 1940 Economic Depression
   most rapid growth 1950 - 1960 Post Korean War Prosperity

3. Yes, more or less

4. highest growth rate 1940 - 1950 - Town of Bethany
   lowest growth rate 1940 - 1950 - Town of Ansonia which had a negative growth rate which means Ansonia lost population during this period.

5. No, the town with the highest growth rate during 1960 - 1970 was the Town of Madison.

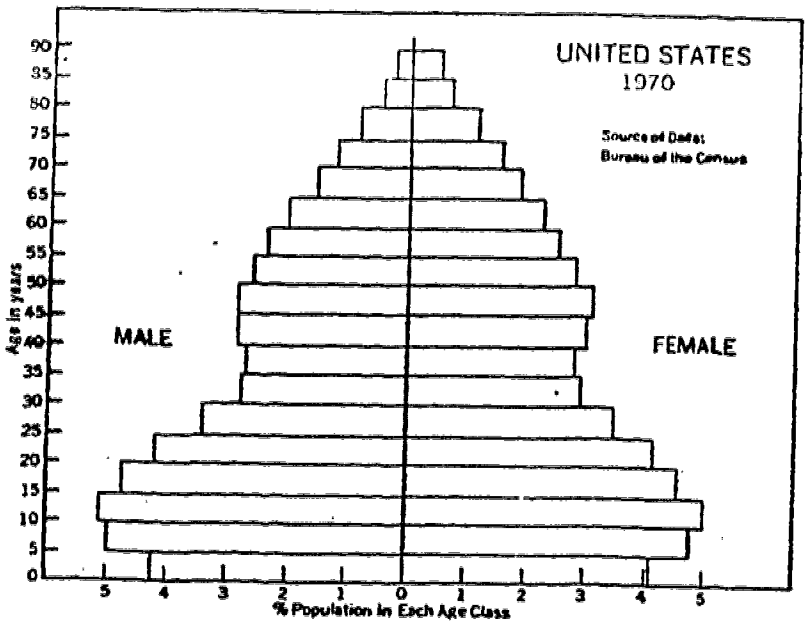
A. Representative Example of a Population Age Pyramid.

100%:
all ages of total population

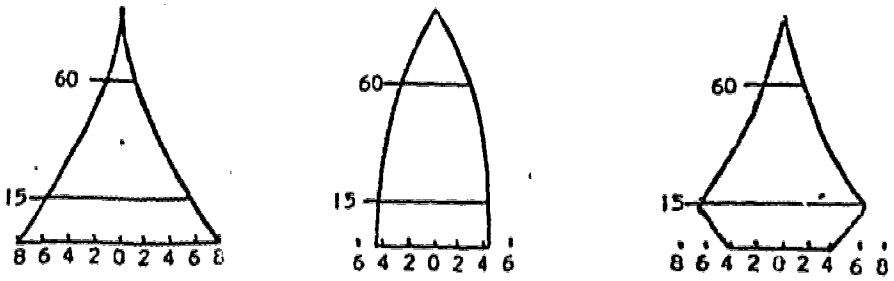
14%:
60 years or older

56.5%:
15-59 years of age

29.5%:
0-14 years of age



B. Three types of Population Age Structures.



growing stable declining

C. How to Calculate the Age Dependency Ratios of a Ponulation.

YDR = Youth dependency ratio = $\frac{\text{number of people under 15 yrs.}}{\text{number of people 15-59 years.}} \times 100$

ADR= aged dependency ratio = $\frac{\text{number of people 60 yrs. and over}}{\text{number of people 15-59 years}} \times 100$

TDR = total dependency ratio = YDR + ADR

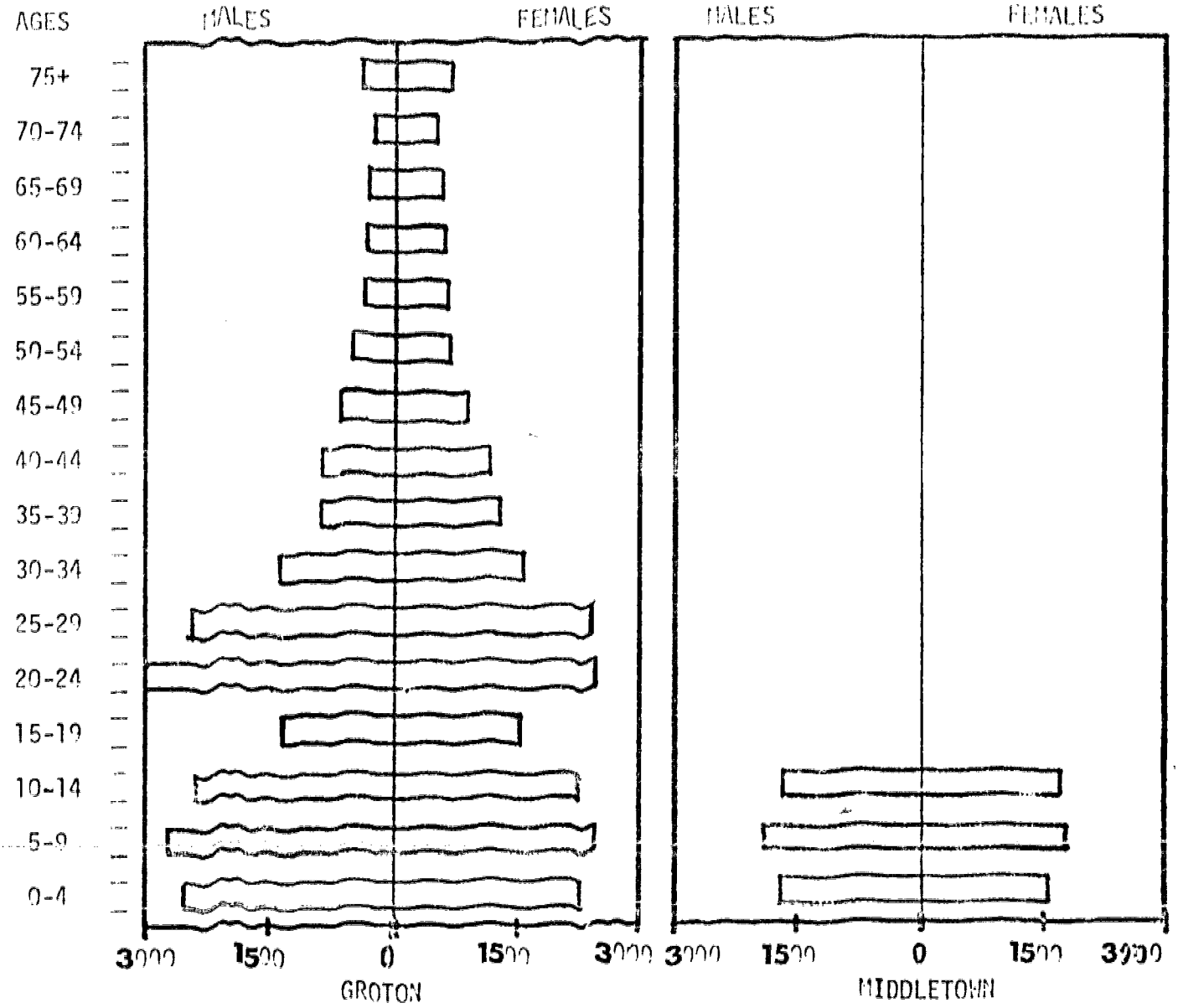
A. A table of age structure distribution for selected Connecticut towns.

	ANSONIA			FARMINGTON			MIDDLETOWN			RIDGEFIELD			STORRS		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	21 160	10 176	10 984	14 390	6 896	7 494	36 924	18 235	18 689	18 188	8 934	9 254	10 691	5 356	5 335
Under 1 year	411	227	184	259	118	141	602	308	294	299	140	159	76	35	41
1 year	341	167	174	219	109	110	604	284	320	286	132	154	71	39	32
2 years	376	203	173	208	114	94	589	308	281	329	163	166	66	36	30
3 years	379	202	177	241	128	113	590	280	310	360	186	174	54	28	26
4 years	408	213	195	253	109	144	658	364	294	429	193	236	52	30	22
5 years	436	205	231	263	125	138	638	338	300	492	265	227	51	32	19
6 years	406	203	201	276	137	139	658	324	334	484	216	268	48	33	15
7 years	382	210	172	292	136	156	604	289	315	497	249	248	43	23	20
8 years	383	198	185	263	130	133	654	341	313	509	273	236	52	22	30
9 years	411	214	197	298	132	166	661	323	338	537	293	244	53	25	28
10 years	411	198	213	307	145	162	661	347	314	562	298	264	42	18	24
11 years	422	211	211	307	151	156	677	332	345	509	271	238	58	33	25
12 years	353	168	185	286	154	132	658	328	330	488	259	229	42	25	17
13 years	389	201	188	335	178	157	577	270	307	456	241	215	55	28	27
14 years	357	168	189	301	163	138	634	320	314	429	206	223	38	19	19
15 years	391	200	191	284	138	146	626	290	336	405	214	191	71	23	48
16 years	351	179	172	278	116	162	566	286	280	373	203	170	50	20	30
17 years	361	171	190	290	161	129	545	263	282	328	176	152	67	30	37
18 years	301	155	146	205	103	102	716	440	276	192	100	92	1 298	587	711
19 years	252	126	126	161	73	88	765	477	288	138	64	74	1 991	968	1 023
20 years	292	122	170	148	71	77	816	471	345	103	45	58	2 042	1 102	940
21 years and over	13 347	6 233	7 114	8 916	4 205	4 711	23 425	11 252	12 173	9 990	4 747	5 243	4 371	2 200	2 171
Under 5 years	1 915	1 012	903	1 180	578	602	3 043	1 544	1 499	1 703	814	889	319	168	151
5 to 9 years	2 018	1 032	986	1 392	660	732	3 215	1 615	1 600	2 519	1 296	1 223	247	135	112
10 to 14 years	1 932	946	986	1 536	791	745	3 207	1 597	1 610	2 444	1 275	1 169	235	123	112
15 to 19 years	1 656	831	825	1 218	591	627	3 218	1 756	1 462	1 429	757	672	3 477	1 628	1 849
20 to 24 years	1 649	737	912	857	352	505	3 745	2 004	1 741	594	243	351	4 485	2 312	2 173
25 to 29 years	1 510	757	753	1 026	502	524	2 691	1 342	1 349	1 037	421	616	521	295	226
30 to 34 years	1 035	524	511	818	416	402	2 015	998	1 017	1 403	661	742	266	159	107
35 to 39 years	1 040	520	520	860	419	441	1 865	971	894	1 562	763	800	169	88	81
40 to 44 years	1 178	565	613	1 015	483	532	2 060	971	1 089	1 426	757	669	199	101	98
45 to 49 years	1 413	666	747	1 055	501	554	2 323	1 090	1 233	1 185	612	573	178	72	106
50 to 54 years	1 393	646	747	947	477	470	2 279	1 101	1 178	829	445	384	170	87	83
55 to 59 years	1 182	574	608	705	371	334	1 895	927	968	536	261	275	136	63	73
60 to 64 years	938	438	500	593	270	323	1 706	811	895	455	213	242	113	50	63
65 to 69 years	708	260	448	431	181	250	1 141	516	625	341	141	200	86	41	45
70 to 74 years	628	248	380	278	112	166	1 010	439	571	284	100	184	42	17	25
75 to 79 years	493	218	275	253	104	149	720	270	450	217	92	125	20	10	10
80 to 84 years	294	125	169	131	57	74	422	169	303	132	51	81	15	5	10
85 years and over	178	77	101	95	31	64	319	114	205	91	32	59	13	2	11
Under 18 years	6 968	3 540	3 428	4 960	2 444	2 516	11 202	5 595	5 607	7 765	3 978	3 787	989	499	490
62 years and over	2 818	1 157	1 661	1 532	636	896	4 593	1 945	2 648	1 304	532	772	241	100	141
65 years and over	2 301	928	1 373	1 188	485	703	3 662	1 508	2 154	1 065	416	649	176	75	101
Median age	29.7	28.5	31.2	29.9	29.7	30.1	28.8	27.2	30.4	27.0	26.0	27.6	21.2	21.3	21.0

	BETHEL			GROTON			MONTVILLE			SEYMOUR			TORRINGTON		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
All ages	10 945	5 322	5 623	38 523	20 425	18 098	15 662	7 874	7 788	12 776	6 280	6 496	31 952	15 269	16 683
Under 1 year	191	89	102	889	475	414	336	186	150	186	86	100	489	234	255
1 year	239	143	96	885	435	450	363	190	173	201	94	107	433	219	214
2 years	206	97	109	860	444	416	333	159	174	239	122	117	467	238	229
3 years	214	114	100	856	441	415	337	182	155	240	130	110	531	270	261
4 years	253	118	135	941	496	445	389	207	182	245	112	133	512	268	244
5 years	266	136	130	970	496	474	403	211	192	254	125	129	548	263	285
6 years	289	160	129	932	483	449	396	207	189	247	132	115	578	287	291
7 years	248	135	113	964	509	455	427	226	201	230	129	101	488	242	246
8 years	253	126	127	922	484	438	391	203	188	246	123	123	567	289	278
9 years	265	134	131	895	440	455	421	219	202	269	132	137	573	288	285
10 years	256	141	115	860	420	440	411	207	204	263	126	137	535	267	268
11 years	262	141	121	781	382	399	398	216	182	291	147	144	610	319	291
12 years	246	127	119	760	387	373	361	195	166	277	154	123	578	304	274
13 years	225	107	118	729	361	368	371	189	182	273	149	124	555	280	275
14 years	214	104	110	680	358	322	339	157	182	276	137	139	608	298	310
15 years	191	101	90	656	348	308	306	153	153	260	133	127	604	303	301
16 years	199	105	94	606	305	301	282	141	141	253	131	122	594	312	282
17 years	164	81	83	537	268	269	251	131	120	228	124	114	567	306	261
18 years	143	66	77	480	247	233	217	122	95	169	81	88	465	232	233
19 years	104	52	52	517	278	239	147	76	71	158	80	78	416	195	221
20 years	110	44	66	751	485	265	158	67	91	153	70	83	363	151	212
21 years and over	8 407	3 001	3 406	22 052	11 682	10 170	8 625	4 230	4 395	7 809	3 763	4 045	20 871	9 704	11 167
Under 5 years	1 103	561	542	4 431	2 291	2 140	1 758	924	834	1 111	544	567	2 432	1 229	1 203
5 to 9 years	1 321	691	630	4 683	2 412	2 271	2 038	1 066	972	1 246	641	605	2 754	1 369	1 385
10 to 14 years	1 203	620	583	3 810	1 908	1 902	1 880	964	916	1 380	713	667	2 886	1 468	1 418
15 to 19 years	801	405	396	2 796	1 446	1 350	1 203	673	530	1 078	549	529	2 646	1 348	1 298
20 to 24 years	588	265	323	4 854	3 191	1 663	1 112	410	642	848	383	465	2 026	916	1 110
25 to 29 years	837	372	465	4 004	2 286	1 718	1 482	721	761	960	473	487	1 938	991	947
30 to 34 years	720	363	357	2 661	1 438	1 223	1 130	569	561	702	373	329	1 483	727	756
35 to 39 years	688	347	341	2 051	1 063	988	1 014	505	509	682	311	351	1 566	767	799
40 to 44 years	675	342	333	1 921	974	947	981	520	461	803	398	405	1 843	859	984
45 to 49 years	605	295	310	1 735	852	883	830	431	399	928	452	476	2 176	1 049	1 127
50 to 54 years	588	291	297	1 420	733	687	666	351	315	936	440	496	2 251	1 043	1 208
55 to 59 years	430	198	232	1 170	548	622	479	234	245	617	319	298	2 143	1 021	1 122
60 to 64 years	390	162	228	960	457	503	338	168	170	484	262	222	1 736	805	931
65 to 69 years	322	153	169	647	284	363	232	115	117	294	132	162	1 299	563	736
70 to 74 years	299	120	179	562	233	329	223	91	132	285	111	174	1 054	428	626
75 to 79 years	199	82	117	367	145	222	149	59	90	241	103	138	841	368	473
80 to 84 years	105	35	70	247	65	182	94	38	56	138	63	75	544	193	351
85 years and over	71	20	51	204	74	130	53	25	28	63	13	50	334	125	209
Under 18 years	4 181	2 159	2 022	14 723	7 532	7 191	6 515	3 379	3 136	4 488	2 286	2 202	9 837	4 987	4 850
62 years and over	1 217	499	718	2 554	1 068	1 488	926	411	515	1 277	549	728	5 053	2 118	2 935
65 years and over	996	410	586	2 027	826	1 201	751	328	423	1 021	422	599	4 072	1 677	2 395
Median age	27.7	26.6	28.6	23.6	23.4	24.2	24.3	23.8	24.6	28.8	28.3	29.3	34.4	32.2	36.4

B. The Construction of Age Pyramids.

We may use the data given in the table of Part A in this Guide Sheet to construct age pyramids. To construct the age pyramid, first in the table the number of males in the first age group, 0-4 for the town of Groton. Then, using the numbers below as a guide, draw out the horizontal bar to the left for males. Repeat for females, completing the horizontal bar on the right. Then continue until bars for all age groups have been drawn in.

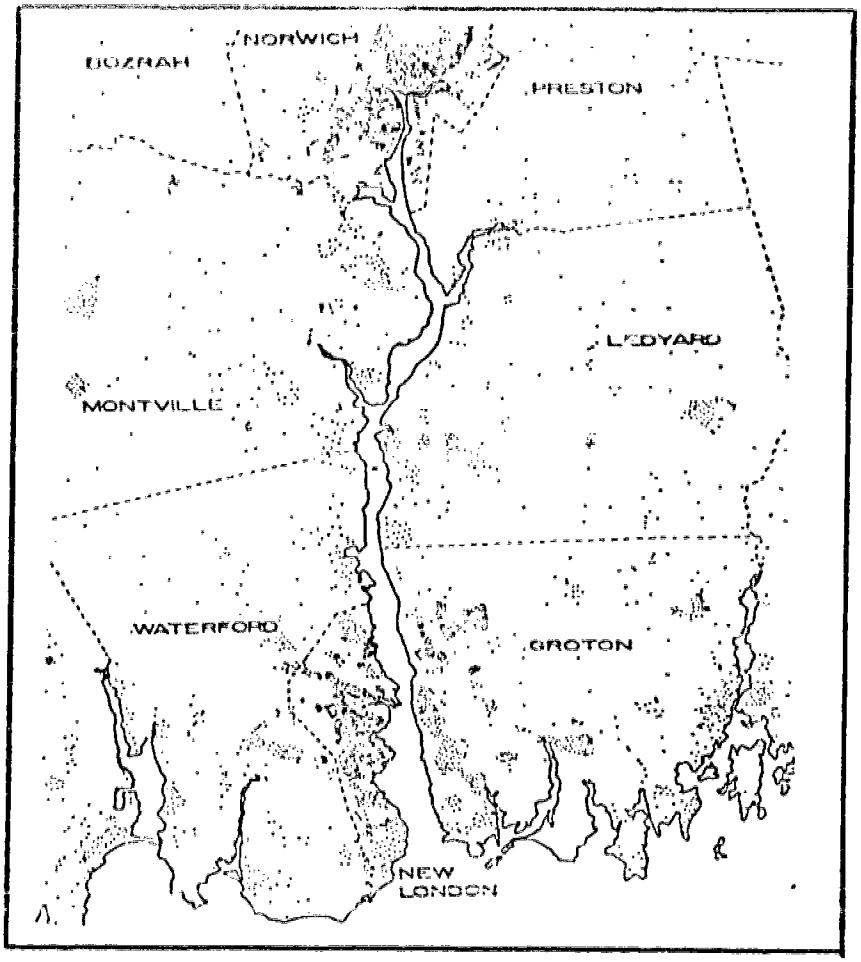


1. Using the data presented above in Part A, finish the age pyramid for the town of Middletown, Connecticut.
2. Do the two towns have similar age structures or do you see a difference evident between them?
3. Are you able to make any predictions regarding the future population trends of these towns?

GUIDE SHEET # 13

Illustrated Concepts of Population Distribution

1. The distribution of a population refers to how individuals of the population are oriented in space relative to one another.
2. A population's distribution in a given area generally, but not always reflects the population density of that area. The difference between population density and population distribution is, however, important. The density of a population refers to the number of people per unit of area without regard to the spatial orientation of the individuals. The distribution of the population examines how individuals fit into the unit of land area.
3. Generally, populations may exhibit one of three broad types of distribution: random in space, corresponding to rural; uniform in space, corresponding to suburban; and clumped or aggregated in space, corresponding to urban.
4. The distribution of a population reflects (1) past and present routes of transportation (2) cultural centers and (3) governing centers.
5. Below is a map indicating the population distribution in a portion of the state of Connecticut. On the map, each dot represents 50 people.
6. Study the map, then answer the questions at the bottom of the page.



1. What basic patterns of distribution are evident relative to the natural features of the area?
2. Are you able to discern rural, suburban and urban patterns of distribution?
3. Where do you find the greatest concentration of people? The least concentration of people?
4. Do you see a relationship between distribution patterns and major potential and actual transportation routes?
5. Do you see a possible distribution pattern between where people are located and where there are potential recreational areas?

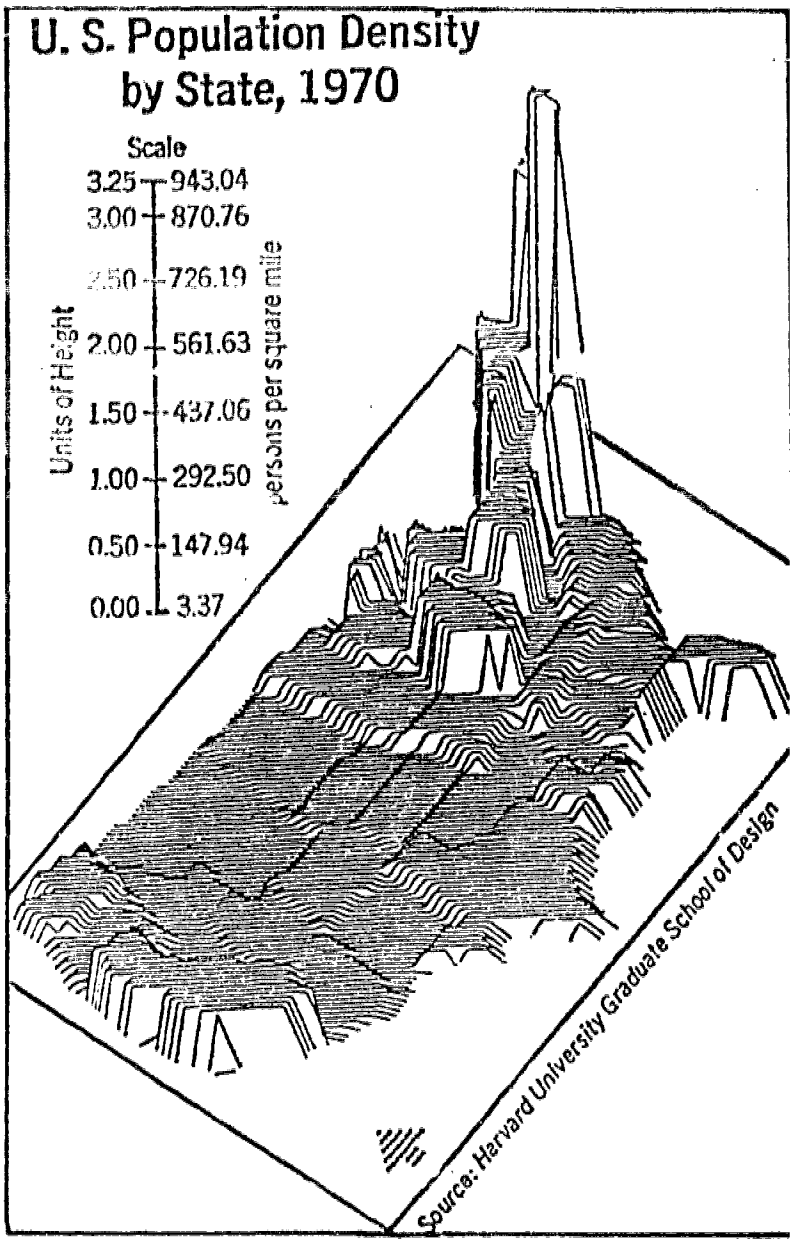
Illustrated Concepts of Population Density

A.

POPULATION DENSITY OF CONNECTICUT TOWNS

	Population Density[1]			Land Area in Miles[2]
	1950	1960	1970	
CONNECTICUT	513	521	622	4870.6
AVON	140	233	356	23.5
BERLIN	279	420	557	26.8
BLOOMFIELD	414	506	695	26.3
BRISTOL	1327	1679	2101	26.4
BURLINGTON	59	90	135	30.0
CANTON	138	181	279	24.6
EAST GRANBY	75	137	202	17.4
EAST HARTFORD	1645	2416	3181	18.1
EAST WINDSOR	180	282	324	26.2
ENFIELD	455	925	1403	32.9
HAMDEN	898	1240	1509	32.7
MADISON	83	122	271	36.0
MERIDEN	1876	2206	2361	23.7
MIDDLEBURY	180	260	314	17.5
MILFORD	1139	1765	2280	22.3
NAUGATUCK	1039	1161	1421	16.2
NEW HAVEN	7309	6758	7484	18.4
PLYMOUTH	305	405	464	22.2
ROXBURY	27	34	46	26.4
SALISBURY	51	54	62	51.6
SHARON	31	35	41	59.8
THOMASTON	401	480	519	12.0
TORRINGTON	726	784	806	39.6
WARREN	16	22	30	27.4
WASHINGTON	57	67	81	38.1

C.



B. INSTRUCTIONS

1. Find the population density of Bristol in the above table. Now, for every 50 people, place an X in the box marked Bristol below.
2. Find the population density of East Windsor from the table. Again, for every 50 people place an X in the box marked East Windsor below.
3. Find the population density for the town of Roxbury in the table and place an X for every 50 people in the box marked Roxbury below. After you have finished this exercise, turn back to the unit.

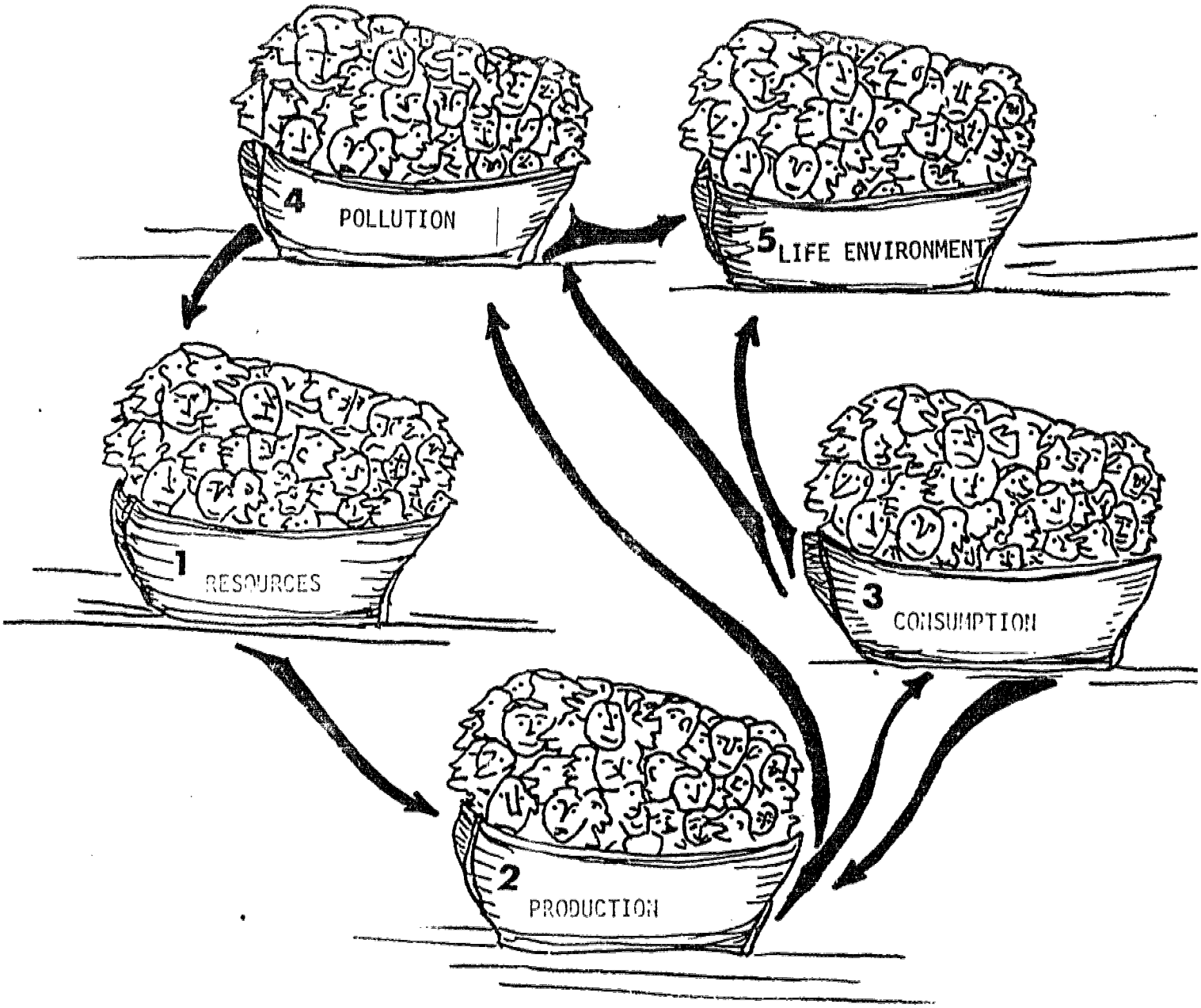
BRISTOL

EAST WINDSOR

ROXBURY

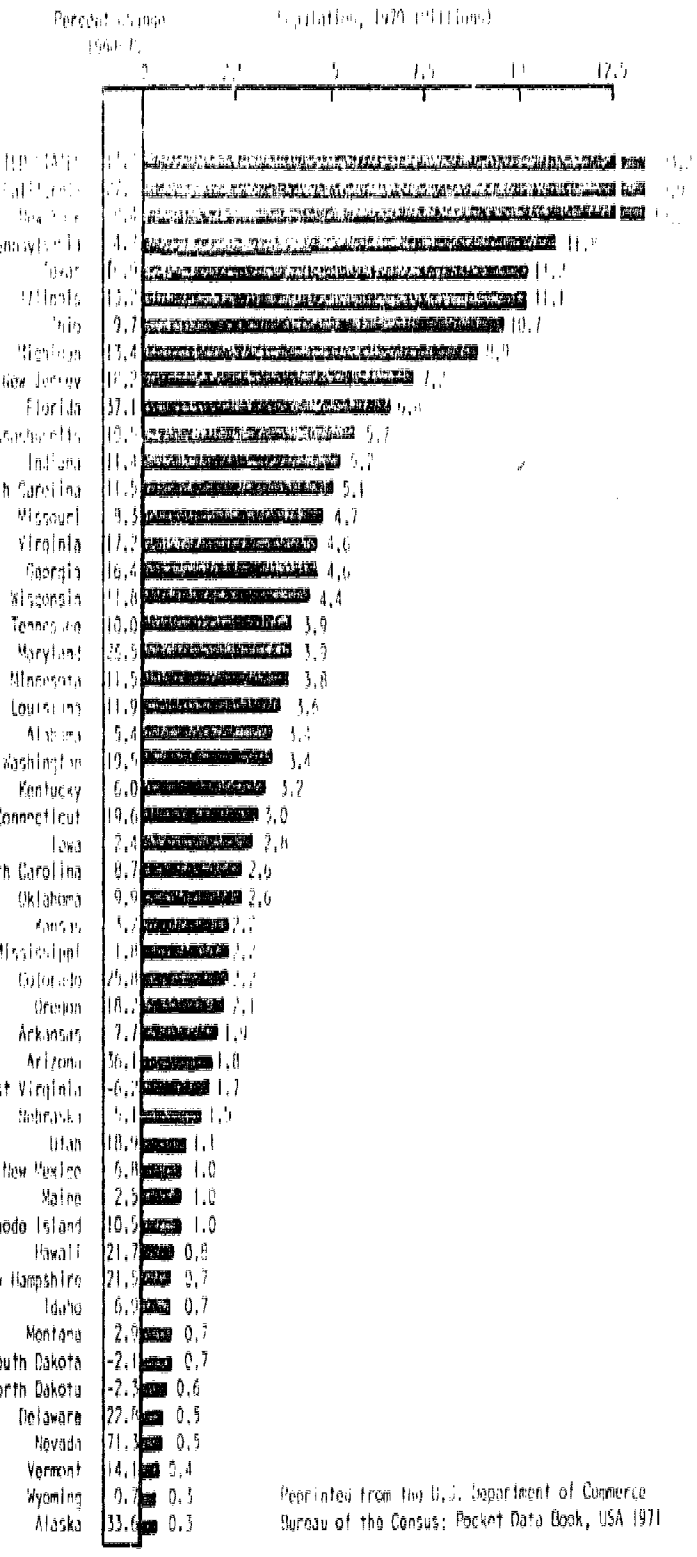
GUIDE SHEET # 15

Aspects of a Population's Carrying Capacity



GUIDE SHEET # 16

STATE POPULATION

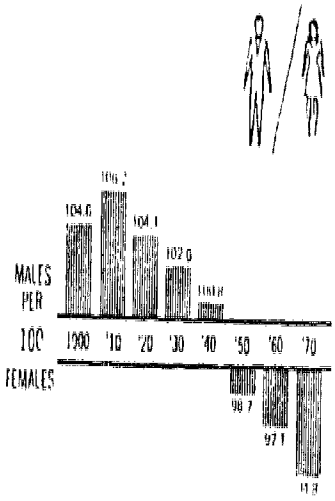


Reprinted from the U.S. Department of Commerce
Bureau of the Census: Pocket Data Book, USA 1971

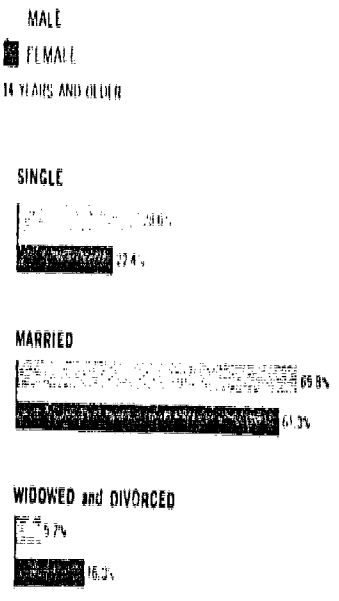
"Representatives and direct taxes shall be apportioned among the several States which may be included within this Union according to their respective numbers . . . The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years in such manner as they shall by law direct."

--Article 1, Section 2
Constitution of the United States

Sex Ratio: 1900 to 1970



Marital Status by Sex: 1970



1970 U.S. CENSUS OF POPULATION: U.S. Department of Commerce, Bureau of the Census

This is your Official Census Form

DO NOT MARK THIS COLUMN

1. WHAT IS THE NAME OF EACH PERSON who was living here on Wednesday, April 1, 1970 or who was staying or visiting here and had no other home?

Line No. — Print names in this order: *Head of the household; Wife of head; Unmarried children, oldest first; Married children and their families; Other relatives of the head; Person not related to the head*

2. HOW IS EACH PERSON RELATED TO THE HEAD OF THIS HOUSEHOLD?

Fill one circle.

If "Other relative of head," also give exact relationship, for example, mother-in-law, brother, niece, grandson, etc.

If "Other not related to head," also give exact relationship, for example, partner, maid, etc.

Line No.	1. Name	2. Relationship to head of household
(1)	Last name First name — Middle initial	○ Head of household ○ Wife of head ○ Son or daughter of head ○ Other relative of head—*Print exact relationship* ○ Roomer, boarder, lodger ○ Patient or inmate ○ Other not related to head—*Print exact relationship*
(2)	Last name First name — Middle initial	○ Head of household ○ Wife of head ○ Son or daughter of head ○ Other relative of head—*Print exact relationship* ○ Roomer, boarder, lodger ○ Patient or inmate ○ Other not related to head—*Print exact relationship*
(3)	Last name First name — Middle initial	○ Head of household ○ Wife of head ○ Son or daughter of head ○ Other relative of head—*Print exact relationship* ○ Roomer, boarder, lodger ○ Patient or inmate ○ Other not related to head—*Print exact relationship*
(4)	Last name First name — Middle initial	○ Head of household ○ Wife of head ○ Son or daughter of head ○ Other relative of head—*Print exact relationship* ○ Roomer, boarder, lodger ○ Patient or inmate ○ Other not related to head—*Print exact relationship*
(5)	Last name First name — Middle initial	○ Head of household ○ Wife of head ○ Son or daughter of head ○ Other relative of head—*Print exact relationship* ○ Roomer, boarder, lodger ○ Patient or inmate ○ Other not related to head—*Print exact relationship*
(6)	Last name First name — Middle initial	○ Head of household ○ Wife of head ○ Son or daughter of head ○ Other relative of head—*Print exact relationship* ○ Roomer, boarder, lodger ○ Patient or inmate ○ Other not related to head—*Print exact relationship*
(7)	Last name First name — Middle initial	○ Head of household ○ Wife of head ○ Son or daughter of head ○ Other relative of head—*Print exact relationship* ○ Roomer, boarder, lodger ○ Patient or inmate ○ Other not related to head—*Print exact relationship*
(8)	Last name First name — Middle initial	○ Head of household ○ Wife of head ○ Son or daughter of head ○ Other relative of head—*Print exact relationship* ○ Roomer, boarder, lodger ○ Patient or inmate ○ Other not related to head—*Print exact relationship*

9. *If you used all 8 lines* —**Are there any other persons in this household?** ○ Yes ○ No

Do not list the others; we will call to get the information.

10. Did you leave anyone out of Question 1 because you were not sure if he should be listed—for example, a new baby still in the hospital, or a lodger who also has another home? ○ Yes ○ No

On back page, give name(s) of person left out.

3. SEX Fill one circle	4. COLOR OR RACE Fill one circle. If "Indian (American)," also give tribe. If "Other," also give race.	DATE OF BIRTH 5. Month and year of birth and age last birthday Print	6. Month of birth Fill one circle	7. Year of birth Fill one circle for first three numbers	Fill one circle for last number	8. WHAT IS EACH PERSON'S MARITAL STATUS? Fill one circle
Male Female	White Negro or Black Indian (Amer.) Print tribe → Japanese Chinese Filipino Hawaiian Korean Other– Print race	Month ______ Year ______ Age ______	Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.	186- 192- 187- 193- 188- 194- 189- 195- 190- 196- 191- 197-	0 5 1 6 2 7 3 8 4 9	Now married Widowed Divorced Separated Never married
Male Female	White Negro or Black Indian (Amer.) Print tribe → Japanese Chinese Filipino Hawaiian Korean Other– Print race	Month ______ Year ______ Age ______	Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.	186- 192- 187- 193- 188- 194- 189- 195- 190- 196- 191- 197-	0 5 1 6 2 7 3 8 4 9	Now married Widowed Divorced Separated Never married
Male Female	White Negro or Black Indian (Amer.) Print tribe → Japanese Chinese Filipino Hawaiian Korean Other– Print race	Month ______ Year ______ Age ______	Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.	186- 192- 187- 193- 188- 194- 189- 195- 190- 196- 191- 197-	0 5 1 6 2 7 3 8 4 9	Now married Widowed Divorced Separated Never married
Male Female	White Negro or Black Indian (Amer.) Print tribe → Japanese Chinese Filipino Hawaiian Korean Other– Print race	Month ______ Year ______ Age ______	Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.	186- 192- 187- 193- 188- 194- 189- 195- 190- 196- 191- 197-	0 5 1 6 2 7 3 8 4 9	Now married Widowed Divorced Separated Never married
Male Female	White Negro or Black Indian (Amer.) Print tribe → Japanese Chinese Filipino Hawaiian Korean Other– Print race	Month ______ Year ______ Age ______	Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.	186- 192- 187- 193- 188- 194- 189- 195- 190- 196- 191- 197-	0 5 1 6 2 7 3 8 4 9	Now married Widowed Divorced Separated Never married
Male Female	White Negro or Black Indian (Amer.) Print tribe → Japanese Chinese Filipino Hawaiian Korean Other– Print race	Month ______ Year ______ Age ______	Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.	186- 192- 187- 193- 188- 194- 189- 195- 190- 196- 191- 197-	0 5 1 6 2 7 3 8 4 9	Now married Widowed Divorced Separated Never married
Male Female	White Negro or Black Indian (Amer.) Print tribe → Japanese Chinese Filipino Hawaiian Korean Other– Print race	Month ______ Year ______ Age ______	Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.	186- 192- 187- 193- 188- 194- 189- 195- 190- 196- 191- 197-	0 5 1 6 2 7 3 8 4 9	Now married Widowed Divorced Separated Never married
Male Female	White Negro or Black Indian (Amer.) Print tribe → Japanese Chinese Filipino Hawaiian Korean Other– Print race	Month ______ Year ______ Age ______	Jan.-Mar. Apr.-June July-Sept. Oct.-Dec.	186- 192- 187- 193- 188- 194- 189- 195- 190- 196- 191- 197-	0 5 1 6 2 7 3 8 4 9	Now married Widowed Divorced Separated Never married

11. Did you list anyone in Question 1 who is away from home now— for example, on a vacation or in a hospital? Yes No

On back page, give name(s) and reason person is away.

12. Did anyone stay here on Tuesday, March 31, who is not already listed? Yes No

On back page, give name of each visitor for whom there is no one at his home address to report him to a census taker.

A. How many living quarters, occupied and vacant, are at this address?

- One
- 2 apartments or living quarters
- 3 apartments or living quarters
- 4 apartments or living quarters
- 5 apartments or living quarters
- 6 apartments or living quarters
- 7 apartments or living quarters
- 8 apartments or living quarters
- 9 apartments or living quarters
- 10 or more apartments or living quarters
- This is a mobile home or trailer

Answer these questions for your living quarters

H1. Is there a telephone on which people in your living quarters can be called?

- Yes — What is the number? _____ *Phone number*
- No

12. Do you enter your living quarters—

- Directly from the outside or through a common or public hall?
- Through someone else's living quarters?

13. Do you have complete kitchen facilities?
Complete kitchen facilities are a sink with piped water, a range or cook stove, and a refrigerator.

- Yes, for this household only
- Yes, but also used by another household
- No complete kitchen facilities for this household

14. How many rooms do you have in your living quarters?
Do not count bathrooms, porches, balconies, foyers, halls, or half-rooms.

- 1 room
- 2 rooms
- 3 rooms
- 4 rooms
- 5 rooms
- 6 rooms
- 7 rooms
- 8 rooms
- 9 rooms or more

15. Is there hot and cold piped water in this building?

- Yes, hot and cold piped water in this building
- No, only cold piped water in this building
- No piped water in this building

16. Do you have a flush toilet?

- Yes, for this household only
- Yes, but also used by another household
- No flush toilet

17. Do you have a bathtub or shower?

- Yes, for this household only
- Yes, but also used by another household
- No bathtub or shower

18. Is there a basement in this building?

- Yes
- No, built on a concrete slab
- No, built in another way *(include mobile homes and trailers)*

H9. Are your living quarters—

- Owned or being bought by you or by someone else in this household? *Do not include cooperatives and condominiums here.*
- A cooperative or condominium which is owned or being bought by you or by someone else in this household?
- Rented for cash rent?
- Occupied without payment of cash rent?

H10a. Is this building a one-family house?

- Yes, a one-family house
- No, a building for 2 or more families or a mobile home or trailer

b. *If "Yes"* — Is this house on a place of 10 acres or more, or is any part of this property used as a commercial establishment or medical office?

- Yes, 10 acres or more
- Yes, commercial establishment or medical office
- No, none of the above

H11. *If you live in a one-family house which you own or are buying*—
What is the value of this property; that is, how much do you think this property (house and lot) would sell for if it were for sale?

- Less than $5,000
- $5,000 to $7,499
- $7,500 to $9,999
- $10,000 to $12,499
- $12,500 to $14,999
- $15,000 to $17,499
- $17,500 to $19,999
- $20,000 to $24,999
- $25,000 to $34,999
- $35,000 to $49,999
- $50,000 or more

If this house is on a place of 10 acres or more, or if any part of this property is used as a commercial establishment or medical office, do not answer this question.

H12. *Answer this question if you pay rent for your living quarters.*
a. *If rent is paid by the month*—
What is the monthly rent?

Write amount here — $ _____ .00 *(Nearest dollar)*

and

Fill one circle

- Less than $30
- $30 to $39
- $40 to $49
- $50 to $59
- $60 to $69
- $70 to $79
- $80 to $89
- $90 to $99
- $100 to $119
- $120 to $149
- $150 to $199
- $200 to $249
- $250 to $299
- $300 or more

b. *If rent is not paid by the month*—
What is the rent, and what period of time does it cover?

$ _____ .00 per _____
(Nearest dollar) *(Week, half-month, year, etc.)*

FOR CENSUS ENUMERATOR'S USE ONLY

a4. Block number | a5. Serial number

	a4	a5
Ø	Ø	Ø
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

B. Type of unit or quarters

Occupied
- First form
- Continuation

Vacant
- Regular
- Usual residence elsewhere

Group quarters
- First form
- Continuation

For a vacant unit, also fill C, D, A, H2 to H8, and H10 to H12

C. Vacancy status

Year round—
- For rent
- For sale only
- Rented or sold, not occupied
- Held for occasional use
- Other vacant

- Seasonal
- Migratory

D. Months vacant

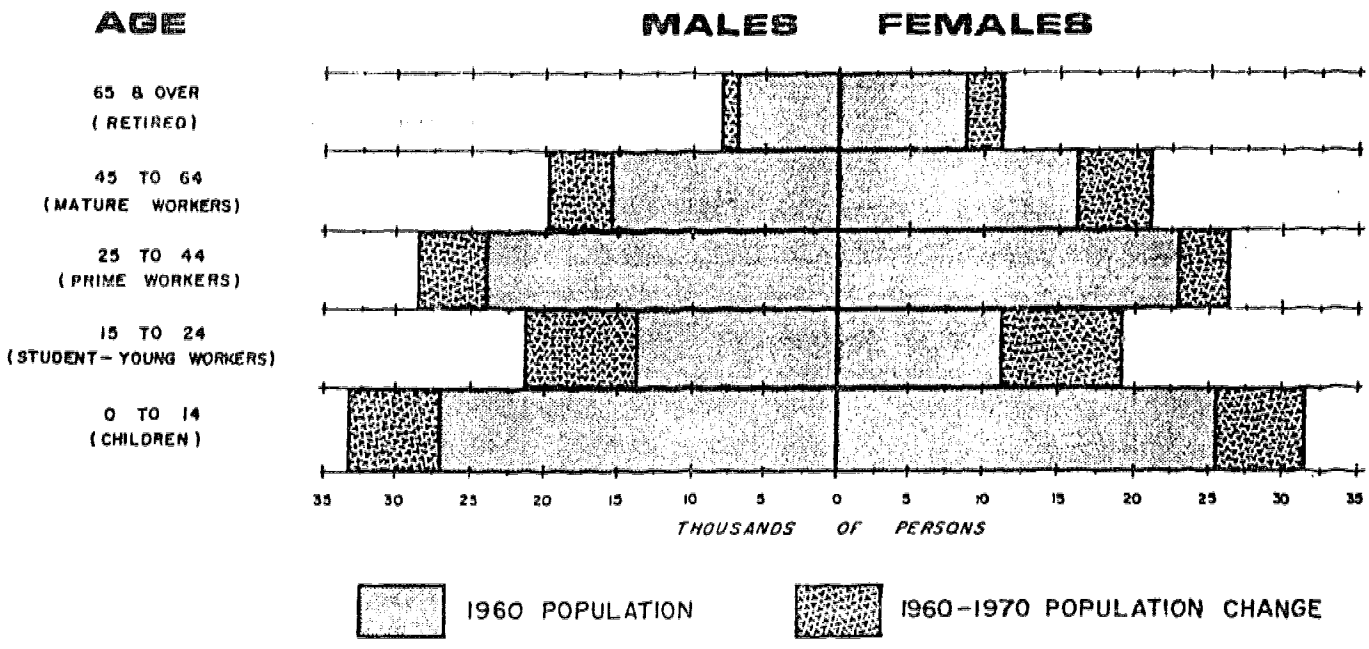
- Less than 1 month
- 1 up to 2 months
- 2 up to 6 months
- 6 up to 12 months
- 1 year up to 2 years
- 2 years or more

C/O

POPULATION CHARACTERISTICS

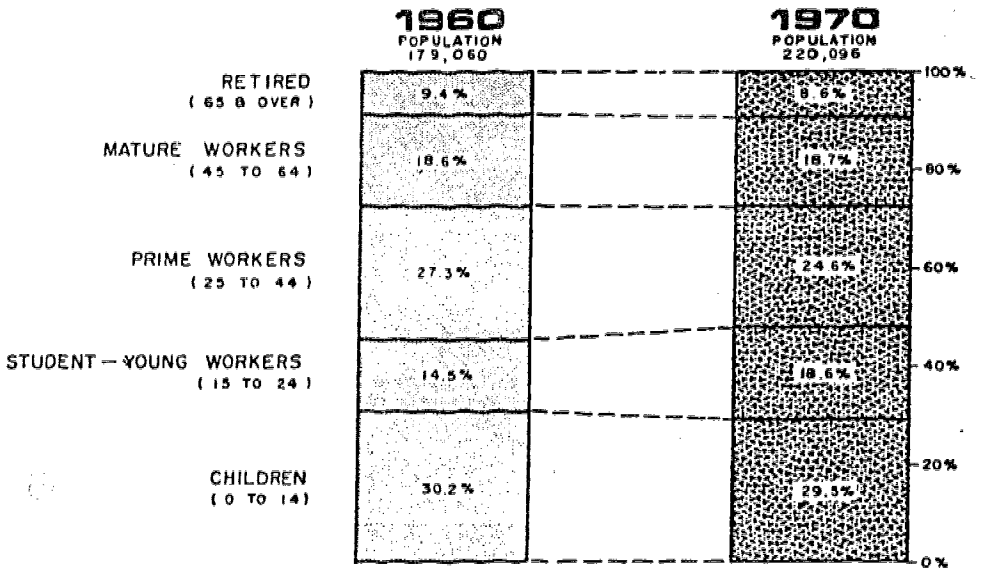
SOUTHEASTERN CONNECTICUT REGION

AGE-SEX DISTRIBUTION



SOURCE : 1970 CENSUS 1ST COUNT SUMMARY TAPE, BUREAU OF THE CENSUS.
1960 CENSUS OF HOUSING AND POPULATION, BUREAU OF THE CENSUS.

AGE GROUPS AS PERCENT OF TOTAL POPULATION

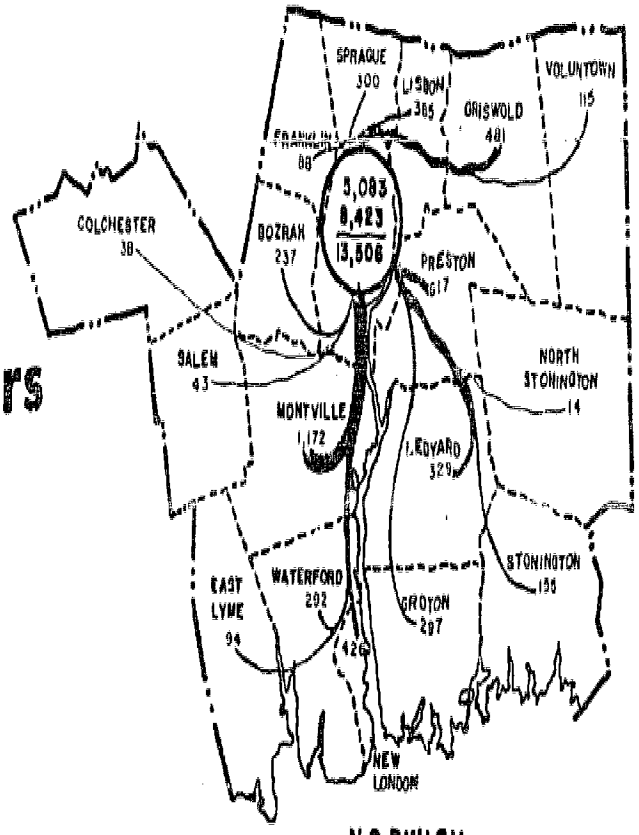


SOURCE : 1970 CENSUS 1ST COUNT SUMMARY TAPE, BUREAU OF THE CENSUS.
1960 CENSUS OF HOUSING AND POPULATION, BUREAU OF THE CENSUS.

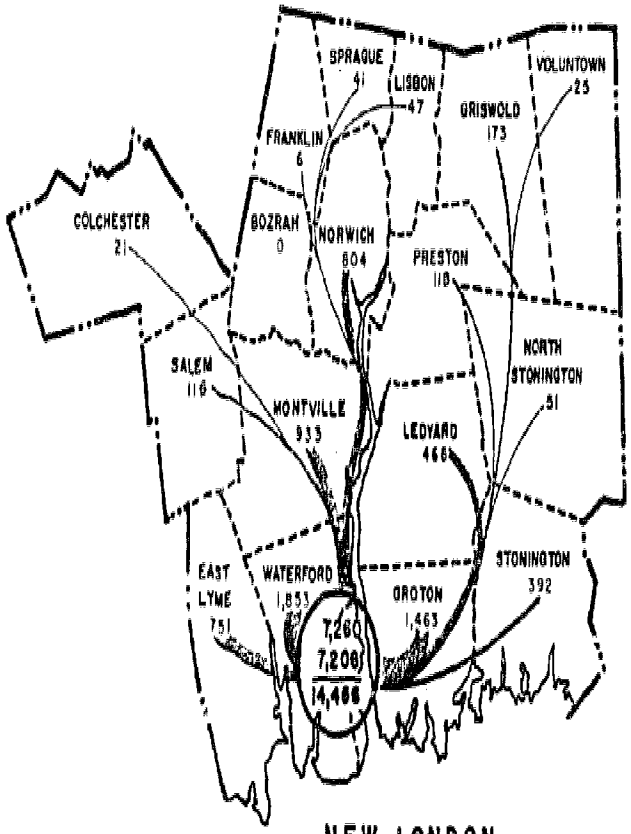
Commutation Of Workers Within Southeastern Connecticut To Major Employment Centers 1970

KEY:
- 1,357 — NON-RESIDENT WORKERS
- 2,468 — RESIDENT WORKERS
- 3,825 — TOTAL WORKERS

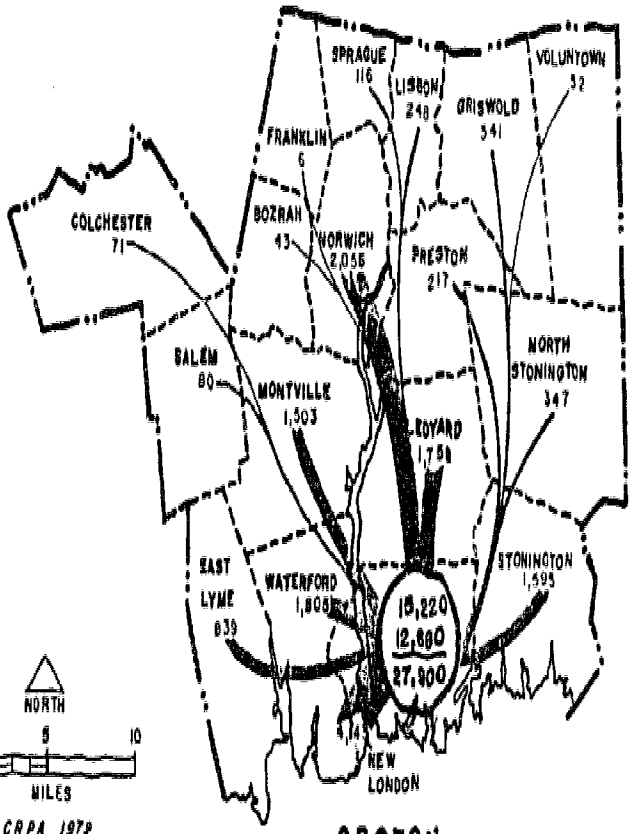
SOURCE: THE 1970 CENSUS ...H INCLUDES MILITARY PERSONNEL AS WELL AS CIVILIAN WORKERS.



NORWICH



NEW LONDON



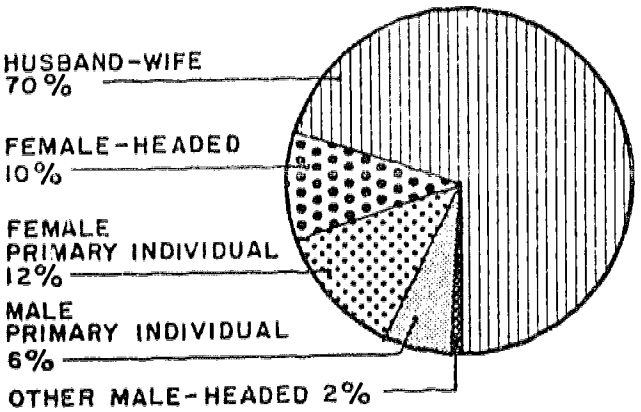
GROTON

SCRPA 1972

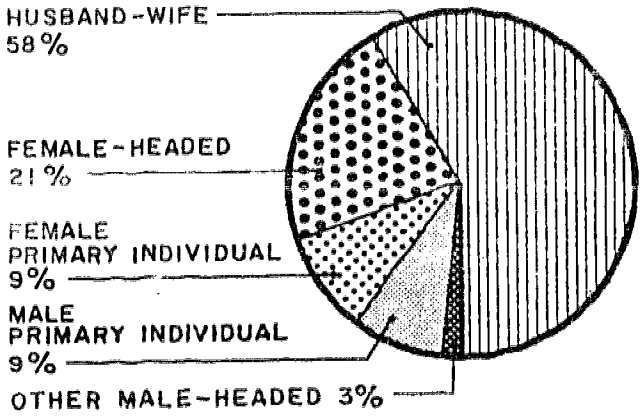
FAMILY ORGANIZATION

SOUTHEASTERN CONNECTICUT REGION-1970

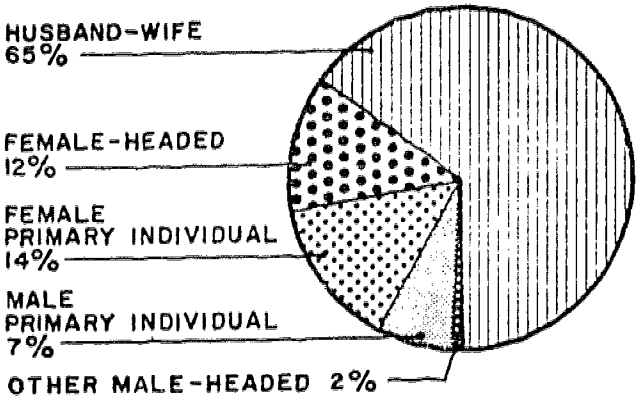
TOTAL 64,388 FAMILIES



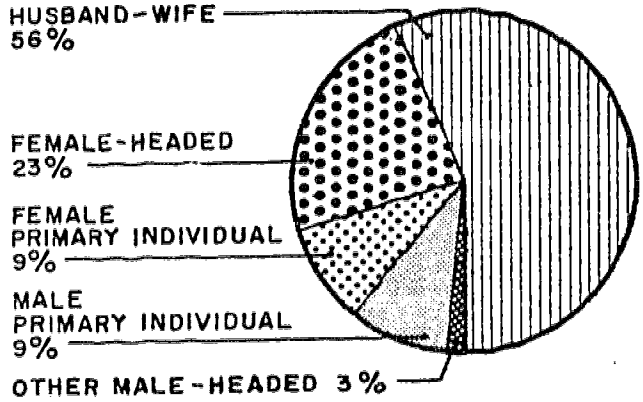
TOTAL 1,850 BLACK FAMILIES



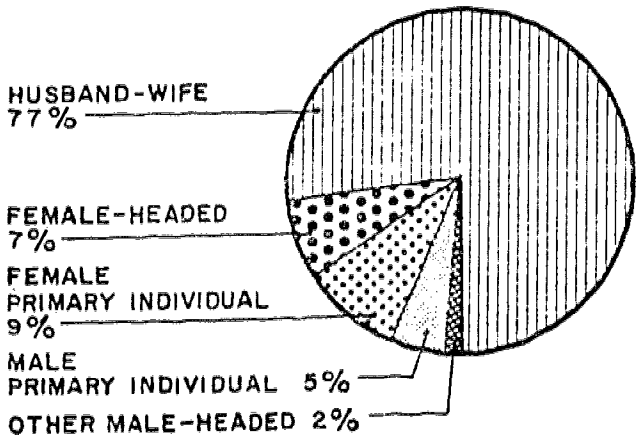
TOTAL 33,205 URBAN FAMILIES



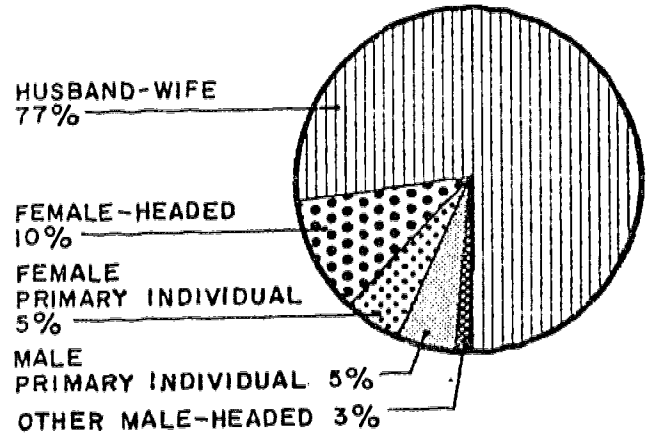
TOTAL 1,612 BLACK URBAN FAMILIES



TOTAL 31,183 SUBURBAN AND RURAL FAMILIES



TOTAL 238 BLACK SUBURBAN AND RURAL FAMILIES



SOURCE: *1ST COUNT SUMMARY TAPE, 1970 CENSUS OF POPULATION AND HOUSING*

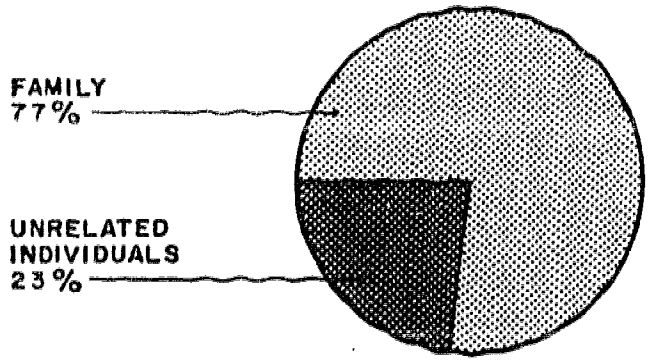
Source of diagram: Southeastern Connecticut Regional Planning Agency

POVERTY STATUS

SOUTHEASTERN CONNECTICUT REGION - 1970

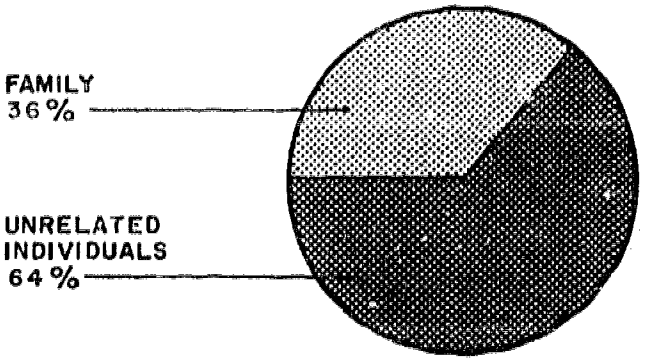
RELATIONSHIP OF ALL POVERTY PERSONS

20,448 POVERTY PERSONS



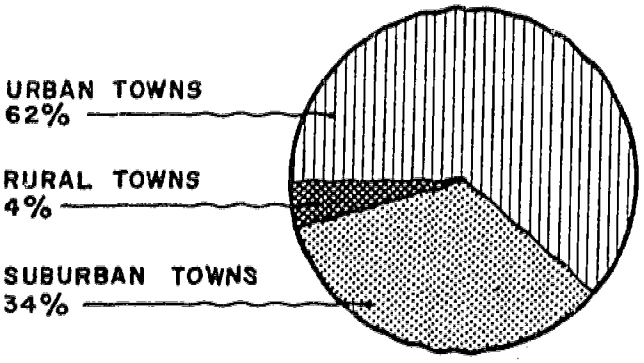
RELATIONSHIP OF ELDERLY POVERTY PERSONS

3,363 POVERTY PERSONS 65 OR OLDER



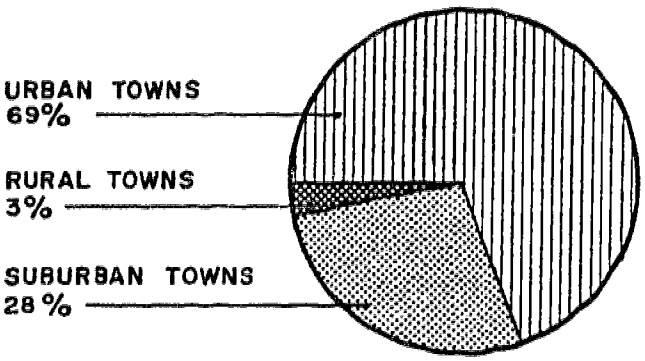
LOCATION OF ALL POVERTY UNRELATED INDIVIDUALS

4,681 UNRELATED INDIVIDUALS



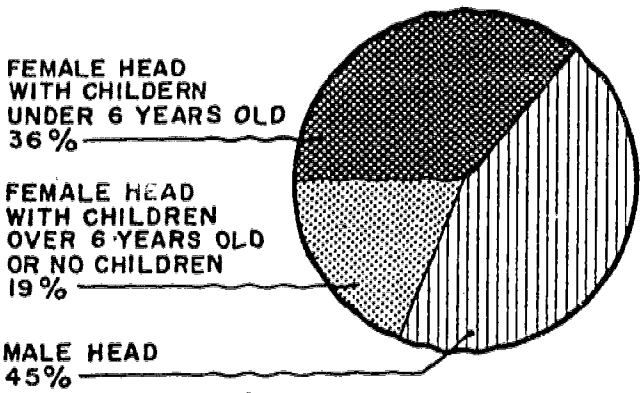
LOCATION OF ALL POVERTY FAMILIES

4,317 FAMILIES



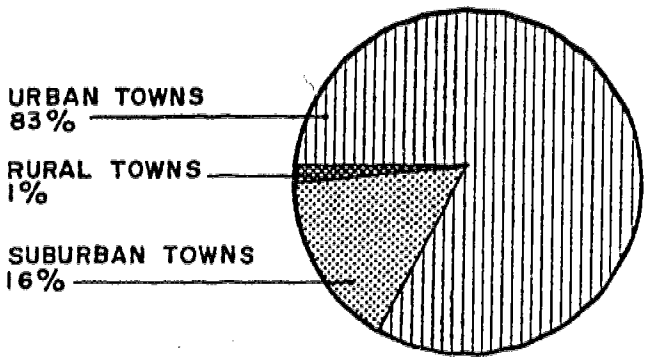
HEAD OF POVERTY FAMILY

4,317 FAMILIES



LOCATION OF FEMALE HEADED FAMILIES WITH CHILDREN UNDER 6 YEARS OLD

1,565 FAMILIES



SOURCE: *PHC(1)-143 NEW LONDON-GROTON-NORWICH CT. SMSA; PC(1)-C8 GENERAL SOCIAL AND ECONOMIC CHARACTERISTICS*

Source of diagram: Southeastern Connecticut Regional Planning Agency

GUIDE SHEET # 18 - PART V

1970 CENSUS DATA FOR A TOWN OR CITY

ITEM	CONNECTICUT	UPLAND, CT.	YOUR TOWN	HOW OR WHERE TO OBTAIN INFORMATION
1) Population				
a) Data from current census				
1970	3,032,217	10,945		Town and Country Fact Book or Census of U.S. Population
1960	2,535,234	8,200		
1950	2,007,280	5,104		
b) Natural Increase 1960-1970 (percentage of pop. increase due to surplus of births over deaths)	220,962	988		Town and Country Fact Book
2) Age Structure				
a) Median age	29.5	27.9		Town and Country Fact Book or Census of U.S. Population
b) Percentage under 18 yrs.	45.2	57.4		Total under 18 yrs. / Total pop. X 100
c) Percentage 65 and over	15.3	15.8		Total over 65 yrs. / Total pop. X 100
d) Detailed age breakdown				
Per cent				
Under 5 yrs.	8.34	8.85		Town and Country Fact Book or Census of U.S. Population, Vol. 1, Connecticut Summary.
5-9 yrs.	9.76	10.10		
10-14 yrs.	10.00	10.11		
15-19 yrs.	8.70	9.13		
20-24 yrs.	7.58	8.35		
25-29 yrs.	6.80	6.93		
30-34 yrs.	5.58	6.15		
35-39 yrs.	5.50	5.45		
40-44 yrs.	6.24	6.15		No. in age group / Total pop. X 100
45-49 yrs.	6.47	6.55		
50-54 yrs.	6.10	5.85		
55-59 yrs.	5.18	5.08		
60-64 yrs.	4.16	5.00		
Over 65 yrs.	9.53	6.30		
TOTAL	100%	100%		
3) Race				
a) Percentage non-white	6.50	-		Census of U.S. Population
b) Percentage Negro	6.00	-		
c) Percentage foreign stock: (the sum of: percentage foreign born and percentage native or foreign or mixed parentage)	0.50	-		
d) Sex ratio (number of males per hundred females)	94.2	94.6		Census of U.S. Population or Town and Country Fact Book
4) Education (people 25 yrs. and over)				
a) Median school yrs. completed	12.2	12.3		Census of U.S. Population or Town and Country Fact Book
b) percentage that completed high school or more	31.8	36.3		"
c) 3 yrs. of high school or less	44.4	40.2		"
d) Percentage that completed 4 yrs. or more of college	13.7	12.1		"

GUIDE SHEET # 1% - PART V (cont.)

1970 CENSUS DATA FOR A TOWN OR CITY (cont.)

ITEM	CONNECTICUT	UPLAND, CT.	YOUR TOWN	HOW OR WHERE TO OBTAIN INFORMATION
5) Income				
a) Median family income	11,811	12,317		Town and Country Fact Book
b) Percentage of families with incomes less than $5,000	11.0%	6.8%		Town and Country Fact Book
c) Percentage of families with income more than $10,000	63.2%	68.1%		Town and Country Fact Book
6) Employment & Occupation of Labor Force 16 yrs. and older				
a) Percentage unemployed as of census date	3.5%	3.8%		Town and Country Fact Book
b) Percentage female pop. 16 yrs. or over in labor foce	45.5%	44.4%		Town and Country Fact Book
c) Percentage married persons employed in labor force	22.0%	22.6%		Town and Country Fact Book
7) Housing				
Total	968,815	3,389		Census of Housing
a) Year Structure Built (in %)				
1969-1970	2.85%	10.12%		
1965-1968	9.61%	10.24%		No. of houses in each category
1960-1964	10.62%	25.14%		All housing units
1950-1959	21.38%	8.03%		X 100 = % of houses in each category
1940-1949	11.57%	38.60%		
1949 or earlier	43.98%			
b) Value				
Median value of owner-occupied units	$25,500	$34,400		Census of Housing
Rents: Median gross monthly rent	$127	$141		Census of Housing
c) Percent vacant and available				For sale only
Homeowner vacancy (for sale only)	0.8%	0.95%		All housing units
Rental vacancy	4.4%	6.4%		X 100 = % for sale only
				For rent
				All housing units
				X 100 = % for rent only
d) Percentage with all plumbing facilities	97.64%	97.61%		Census of Housing
Percentage lacking one or more plumbing facilities	2.36%	2.39%		Census of Housing
8) Housing				
a) Median number of rooms per unit				
Owner occupied units	6	8		Census of Housing
Rental units	4	5		
b) Crowding - Population per occupied unit				
Percentage of all housing units with more than 1 person per room	4.84%	.60%		Census of Housing
c) Percentage owner-occupied	62.50%	75.20%		Census of Housing
d) Mobility: Year moved into unit (in %)				Census of Housing
Total	583,410	2,491		
1969-1970	7.80%	12.89%		
1968	6.90%	8.63%		

1970 CENSUS DATA FOR A TOWN OR CITY (cont.)

ITEM	CONNECTICUT	UPLAND, CT.	YOUR TOWN	HOW OR WHERE TO OBTAIN INFORMATION
1967	5.80%	7.43%		
1965-1966	11.04%	11.16%		
1960-1964	19.35%	17.06%		Census of Housing
1950-1959	28.05%	24.73%		
1949 Or earlier	21.06%	20.05%		
Renter-occupied (Total)	349,640	754		
1969-1970	32.53%	42.84%		
1968	14.60%	17.24%		
1967	9.53%	3.58%		
1965-1966	12.71%	12.73%		Census of Housing
1960-1964	13.59%	14.06%		
1950-1959	9.11%	5.04%		
1949 or earlier	7.94%	4.51%		
9) Sewage disposal (in%)				
Public sewer	62.82%	58.34%		Census of Housing
Septic Tank	36.60%	41.46%		Census of Housing
Other	.58%	.21%		Census of Housing
10) Source of water				
Public water	79.45%	65.50%		Census of Housing
Individual well	20.04%	33.08%		Census of Housing
Other	.51%	1.42%		Census of Housing

SOURCES OF CENSUS DATA

Office Of State Planning
Department of Finance and Control
340 Capitol Avenue
Hartford, Conn. 06115

Publication Distribution Section
Bureau of the Census
Washington, D.C. 20233

Publications: Characteristics of the Population
Number of Inhabitants
General Social and Economic Characteristics
Census of Housing

A volume of this series is published for each state and a volume for the nation. The state volumes contain data for each town, city and county.

Storrs Agricultural Experiement Station
University of Connecticut
Storrs, Conn.

Publication: Town and County Fact Book

Your Town Library

Your Town Develc ment Commission

GUIDE SHEET # 19

COMMUNITY SURVEY

Date _____ Name of Community _____

A. How would you rank the following planning and development activities in your community?

	Excellent	Good	Fair	Poor	Don't Know
1. Effectiveness of local governmental efforts in meeting the community's problems	( )	( )	( )	( )	( )
2. Real qualified leaders who are willing and able to accept a leadership role in community improvement	( )	( )	( )	( )	( )
3. The appearance of the city as planned into separate residential, business, industrial, and recreational areas	( )	( )	( )	( )	( )
4. Zoning regulations and enforcement	( )	( )	( )	( )	( )
5. Cooperation among organizations	( )	( )	( )	( )	( )
6. Coordination of organizations and activities	( )	( )	( )	( )	( )

B. How would you rank the following human relations and cultural enrichment conditions in your community or area?

	Excellent	Good	Fair	Poor	Don't Know
1. Library services and quality	( )	( )	( )	( )	( )
2. Opportunities in cultural activities in music, drama, art, etc.	( )	( )	( )	( )	( )
3. Good year-round recreational program for youth	( )	( )	( )	( )	( )
4. Opportunities for outdoor sports	( )	( )	( )	( )	( )
5. Local and regional parks - availability	( )	( )	( )	( )	( )
6. TV (programs, range, choice, and reception)	( )	( )	( )	( )	( )
7. Radio (programs, range, choice, and reception)	( )	( )	( )	( )	( )
8. Interesting and useful activites for retired people	( )	( )	( )	( )	( )

B. Human Relations (cont.)

	Excellent	Good	Fair	Poor	Don't Know
9. Opportunities to belong to friendly groups of common age and interest	( )	( )	( )	( )	( )
10. Opportunities to develop and pursue hobbies and special interests	( )	( )	( )	( )	( )
11. Schools: teachers, programs, facilities	( )	( )	( )	( )	( )
12. Overall quality of education opportunities	( )	( )	( )	( )	( )
13. Adult educational opportunities	( )	( )	( )	( )	( )
14. Utilization of school facilities for community programs, such as recreation, meetings & civic activities	( )	( )	( )	( )	( )
15. Vocational Educational opportunities	( )	( )	( )	( )	( )
16. Help for persons who need advice and guidance in solving human relationship problems	( )	( )	( )	( )	( )
17. Scouts, 4-H, FFA, FHA, other youth programs	( )	( )	( )	( )	( )
18. Local newspaper keeps citizens well informed about community projects, problems, etc.	( )	( )	( )	( )	( )

C. How would you rank the following Economic Development activities in your community or area?

	Excellent	Good	Fair	Poor	Don't Know
1. Local businessmen serve the needs of community residents	( )	( )	( )	( )	( )
2. Citizens have maintained a favorable attitude toward attracting new business and industry	( )	( )	( )	( )	( )
3. Increasing number of business opportunities	( )	( )	( )	( )	( )
4. Adequate job opportunities for the high school graduate	( )	( )	( )	( )	( )
5. Adequate job opportunities for women who wish to work	( )	( )	( )	( )	( )
6. The local government promotes more balanced industrial development	( )	( )	( )	( )	( )

C. Economic Development (cont.)

	Excellent	Good	Fair	Poor	Don't Know
7. Our community has good reception and is attractive to tourists	( )	( )	( )	( )	( )
8. Our community advertises for summer activities and available facilities for tourists	( )	( )	( )	( )	( )
9. Opportunity for earning a liveable income	( )	( )	( )	( )	( )

D. How would you rank the following Physical Environmental conditions in your community or area?

	Excellent	Good	Fair	Poor	Don't Know
1. Air quality and control of air pollution	( )	( )	( )	( )	( )
2. [illegible] quality and control of water [illegible]	( )	( )	( )	( )	( )
3. [illegible] of the community	( )	( )	( )	( )	( )
4. [illegible] public buildings, grounds, parks	( )	( )	( )	( )	( )
5. [illegible] historic [illegible]	( )	( )	( )	( )	( )
6. [illegible]	( )	( )	( )	( )	( )
7. [illegible]	( )	( )	( )	( )	( )
8. [illegible]	( )	( )	( )	( )	( )
9. [illegible]	( )	( )	( )	( )	( )
10. [illegible]	( )	( )	( )	( )	( )
11. [illegible] housing in the [illegible]	( )	( )	( )	( )	( )
12. [illegible] [illegible] to be [illegible]	( )	( )	( )	( )	( )

E. Community Services (cont.)	Excellent	Good	Fair	Poor	Don't Know
4. Public housing development	( )	( )	( )	( )	( )
5. Quality of hospital and medical facilities (buildings, etc.)	( )	( )	( )	( )	( )
6. Availability of physicians and medical personnel (range of services)	( )	( )	( )	( )	( )
7. Availability of dental personnel	( )	( )	( )	( )	( )
8. Public health services designated to help people maintain good health and stay well (Public nurses, etc.)	( )	( )	( )	( )	( )
9. Availability of good shopping facilities	( )	( )	( )	( )	( )
10. Trade and Craftsman Services (Carpenters, Plumbers, Mechanics, etc.)	( )	( )	( )	( )	( )
11. Local banking services	( )	( )	( )	( )	( )
12. Effectiveness of law enforcement personnel	( )	( )	( )	( )	( )
13. Community's fire protection service	( )	( )	( )	( )	( )
14. Airport facilities	( )	( )	( )	( )	( )
15. Public transportation (buses, schedules, etc.)	( )	( )	( )	( )	( )
16. Veterinary services	( )	( )	( )	( )	( )
17. Water system maintenance and quality	( )	( )	( )	( )	( )
18. Postal services	( )	( )	( )	( )	( )
19. Garbage collection and disposal	( )	( )	( )	( )	( )
20. Sewer system maintenance	( )	( )	( )	( )	( )
21. Roads: highways and streets	( )	( )	( )	( )	( )
22. Snow removal	( )	( )	( )	( )	( )
23. Parking facilities: availability and convenience	( )	( )	( )	( )	( )
24. Fund raising services (United Fund, cancer, etc.)	( )	( )	( )	( )	( )

F. Below is a list of services that generally require taxes for maintenance and construction. Would you be willing to pay more taxes if you knew that money would be spent in your community for that particular purpose?

		Yes	No
1.	To improve streets and roads	( )	( )
2.	To provide better education	( )	( )
3.	To build parks	( )	( )
4.	To upgrade criminal justice and law enforcement	( )	( )
5.	To improve medical services	( )	( )
6.	To improve fire protection	( )	( )
7.	To provide housing for the elderly	( )	( )
8.	To help finance low-income housing	( )	( )
9.	To support better training for local governmental officials	( )	( )
10.	To develop an industrial site	( )	( )
11.	To increase salaries of local public servants	( )	( )
12.	To improve sanitary systems	( )	( )
13.	To improve water systems	( )	( )
14.	To provide better transportation for elderly people	( )	( )

G. Should greater cooperation between towns and counties in your area be sought in:

		Agree Strongly	Agree	Neutral	Disagree	Disagree Strongly	Don't Know
a.	Law enforcement	( )	( )	( )	( )	( )	( )
b.	Street maintenance	( )	( )	( )	( )	( )	( )
c.	Water system maintenance	( )	( )	( )	( )	( )	( )
d.	Sewer system maintenance	( )	( )	( )	( )	( )	( )
e.	Public schools	( )	( )	( )	( )	( )	( )
f.	Public housing development	( )	( )	( )	( )	( )	( )
g.	Fire protection	( )	( )	( )	( )	( )	( )
h.	Garbage collection & disposal	( )	( )	( )	( )	( )	( )
i.	Recreational facilities	( )	( )	( )	( )	( )	( )
j.	Industrial development	( )	( )	( )	( )	( )	( )
k.	Airport facilities	( )	( )	( )	( )	( )	( )
l.	Medical care facilities	( )	( )	( )	( )	( )	( )
m.	Dental care facilities	( )	( )	( )	( )	( )	( )
n.	Library facilities	( )	( )	( )	( )	( )	( )
o.	Code enforcement (buildings, housing, plumbing, electrical, fire prevention)	( )	( )	( )	( )	( )	( )
p.	Regional planning commission	( )	( )	( )	( )	( )	( )
q.	Purchasing supplies	( )	( )	( )	( )	( )	( )
r.	Zoning regulations and enforcement	( )	( )	( )	( )	( )	( )

H. In 1950 the year-round population of _____ was 29,715. Now the population is about 49,357. Do you think the problems of _____ are caused mostly by (please check one):

Too many people _____

Too few people _____

Increasing number of summer residents _____

Tourists _____

Shoppers _____

Other _____

I. How much do you value the physical characteristics of the following areas of town?

	Value Highly	Some Value	No Value
(1) State forest	_____	_____	_____
(2) Town Green	_____	_____	_____
(3) Little League field	_____	_____	_____
(4) Public country club	_____	_____	_____
(5) Steambelt	_____	_____	_____
(6) Local lake or pond	_____	_____	_____
(7) Game preserve	_____	_____	_____
(8) Nature center	_____	_____	_____
(9) Town Park	_____	_____	_____
(10) Picnic Area	_____	_____	_____

J. List three projects you think would be most beneficial to your community in the next few years.

1.

2.

3.

K. In your opinion, who are the four or five persons in your area who are most influential in deciding whether a proposed community or county project gets the nod of approval or whether it gets rejected? (Write in the names of these influential people)

1. _____

2. _____

3. _____

4. _____

5. _____

L. What organizations, businesses, or groups are most influential in deciding whether something should or should not happen in the community? (List at least three.)

1. _____

2. _____

3. _____

M. About yourself

1. Are you: Male ( ) Female ( )

2. a. What is your present age?

_____ 15 - 24 _____ 45 - 54

_____ 25 - 34 _____ 55 - 64

_____ 35 - 44 _____ 65 or over

b. Retired: Yes _____ No _____

c. Number of children _____ Ages _____

_____

_____

_____

3. How many years have you lived in this community?

_____ years

_____ all my life

4. Do you expect to be living in this community five years from now?

_____ yes _____ Don't know

_____ no

5. Are you buying or renting your home?

_____ no answer _____ renting

_____ buying or own

6. What is the occupation of the principal wage earner of the family:

_____ Farmer

_____ Businessman & Managerial

_____ White collar (Store clerk, secretarial, etc.)

_____ Blue collar (Truck driver, laborer, etc.)

_____ Professional (Doctor, teacher, lawyer)

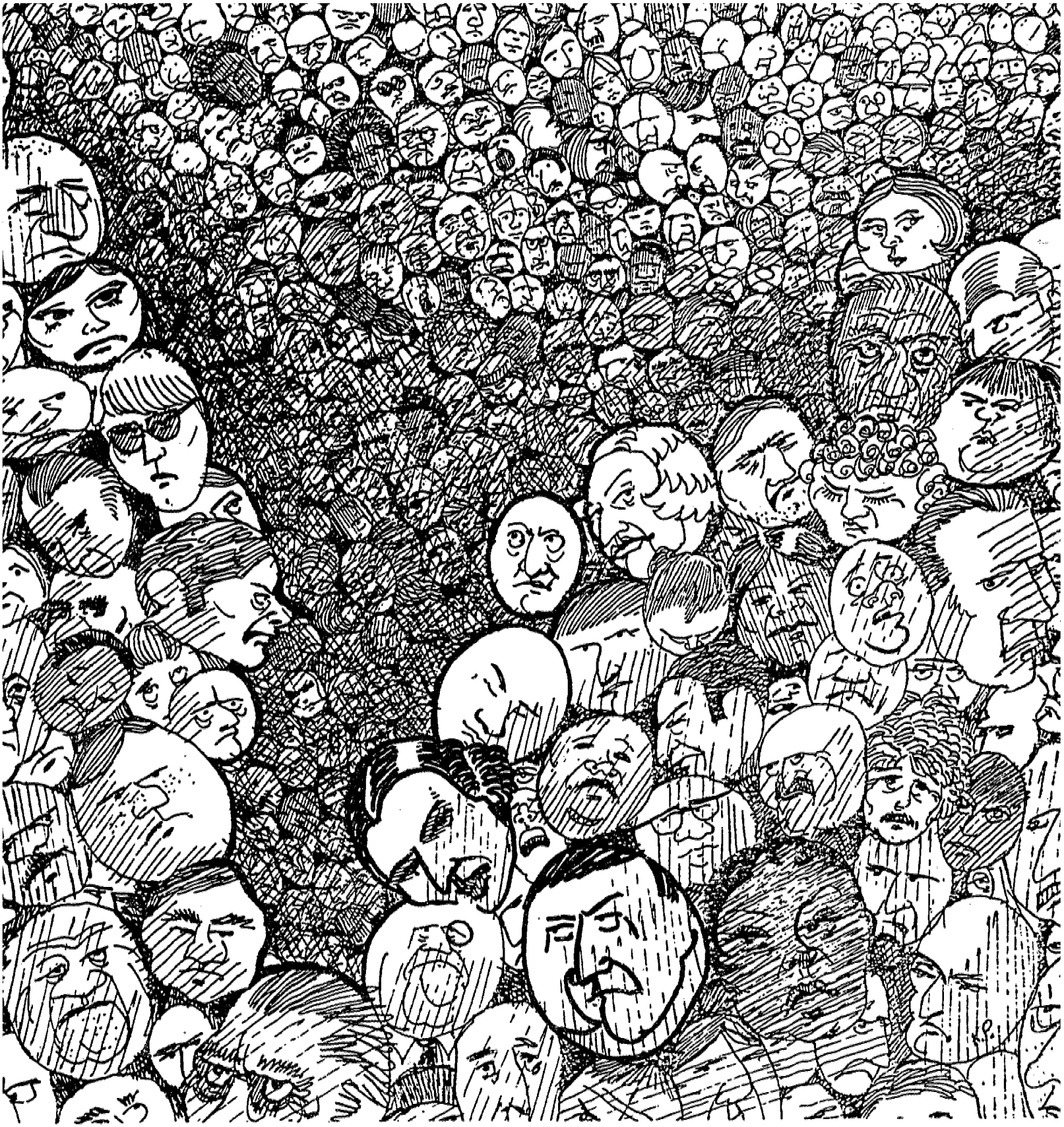
_____ Retired

_____ Student

_____ Housewife

_____ Other (Specify)

7. City where employed? _____



"Psst...We're overpopulated---pass it on..."

"I've got the Solution,

Lets go to Mars!"

GUIDE SHEET # 20

A First Population Exercise

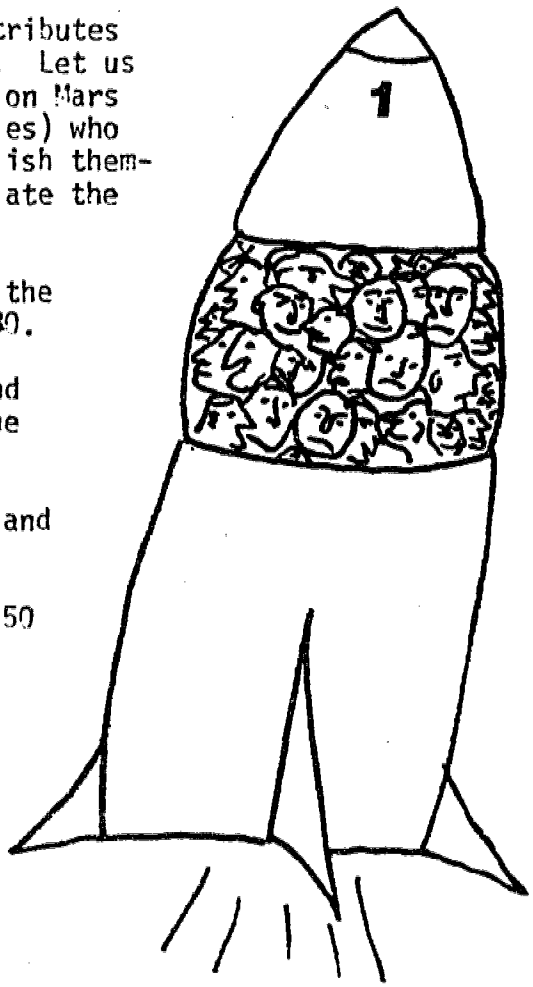
Here is your chance to see how all of the attributes of populations so far discussed fit together. Let us take an imaginary spaceship which has landed on Mars with a group of twenty 20 year olds (10 couples) who will colonize the planet. The couples establish themselves and begin to have children. We stipulate the following assumptions:

(1) Each couple will have two children at the age of 20 and two more at the age of 30.

(2) Their children will grow up, marry, and have the same number of children at the same time.

(3) There will be an equal number of male and female babies.

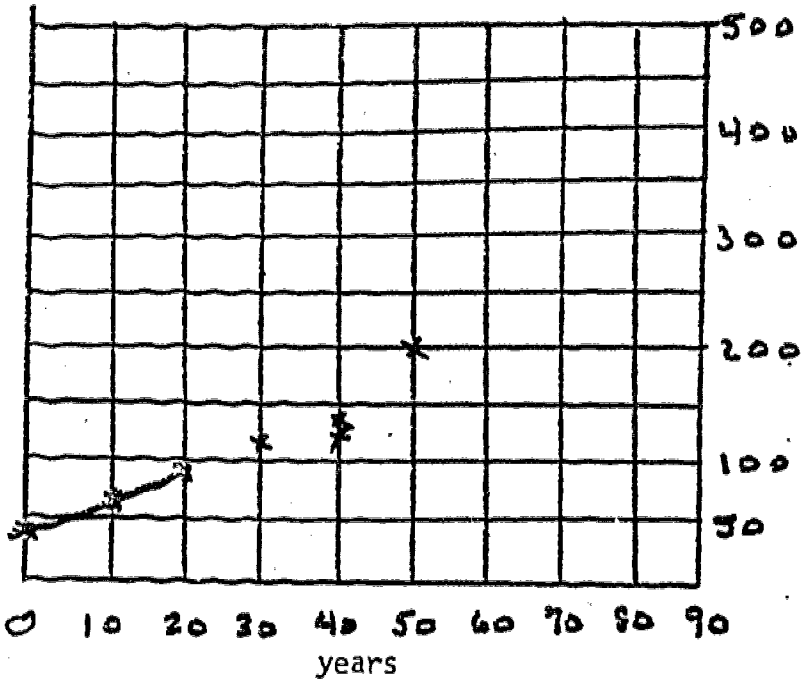
(4) Everyone will die between the ages of 50 and 60.



FILL IN THE CHART:

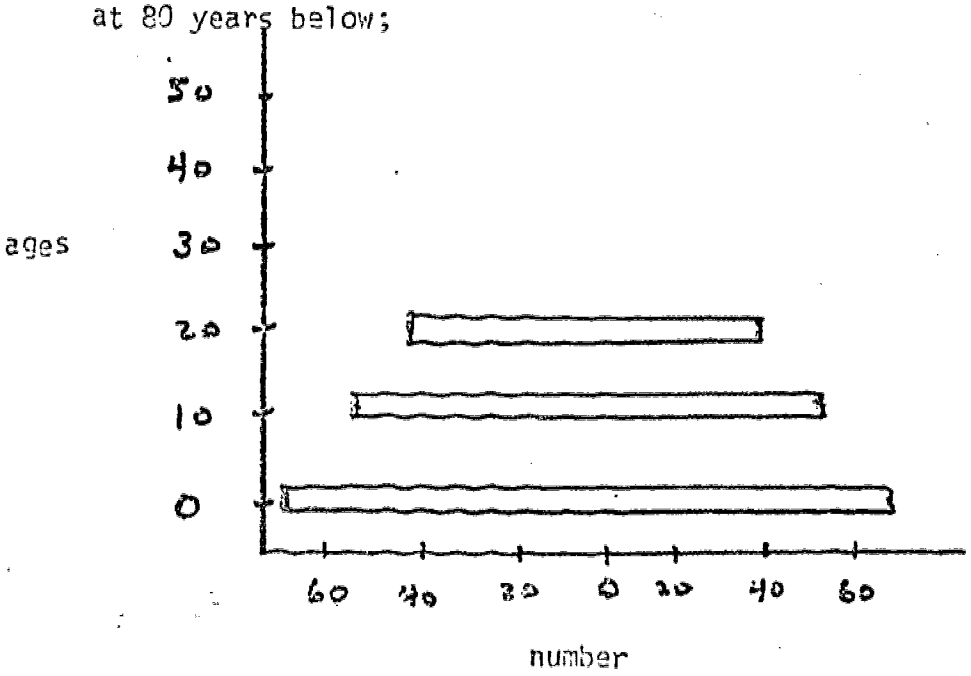
YEAR	TOTAL NO. OF PEOPLE	NUMBER OF PEOPLE AT EACH AGE						
		BABIES	10	20	30	40	50	DIED
1	40	20		20				
10	60	20	20		20			
20								
30								
40								
50								
60								
70								
80								

(Continued)



Plot the growth of the population on the graph above

Now, complete the age distribution chart for the population at 80 years below;



GUIDE SHEET # 21

A Contrasting Population Growth Exercise

Now that you have computed the population growth rate of the Mars Community with a four child per family average, you can see how rapidly the population expanded. Next, lets alter the basic assumptions and try again. The new assumptions are:

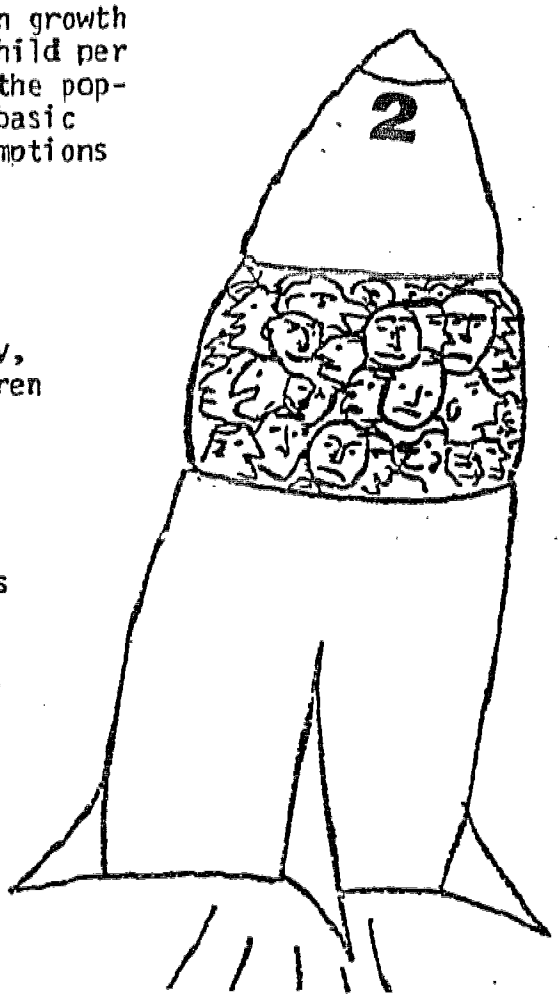
(1) Each couple will have only two children at the age of 30..

(2) Their children will grow up, marry, and have the same number of children at the same time.

(3) There will be an equal number of male and female babies.

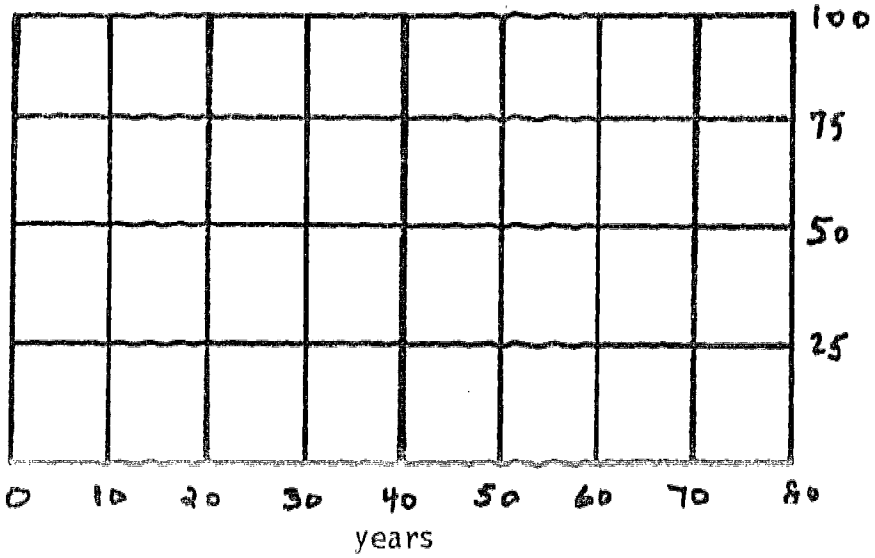
(4) Everyone will die between the ages of 70 and 80.

Now compute the growth data and contrast growth in this community with the Mars I Community.



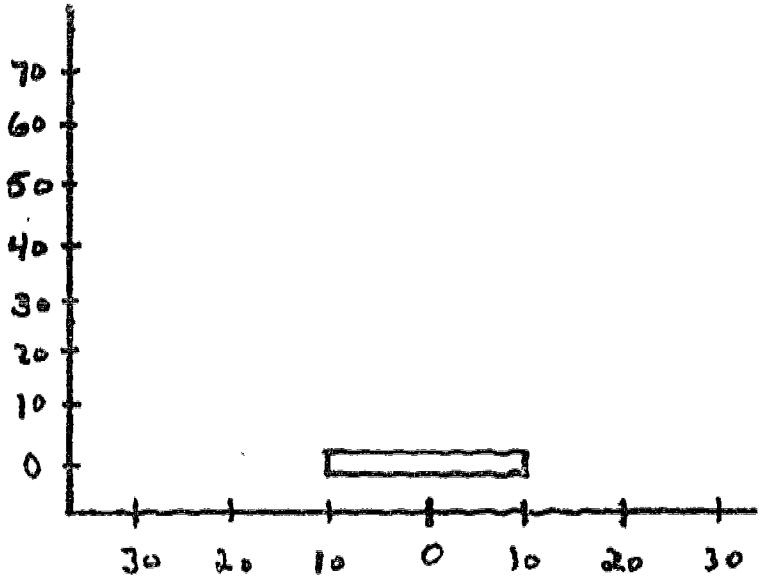
FILL IN THE CHART

YEAR	TOTAL NO. OF PEOPLE	NUMBER OF PEOPLE AT EACH AGE								
		BABIES	10	20	30	40	50	60	70	DIED
1	20			20						
10										
20										
30										
40										
50										
60										
70										
80										



Plot the growth of the population on the graph above.

Now, complete the age distribution chart for the population at 80 years below.



B. A closing thought:

" . . . the population growth numbers are striking, but their implications are of far greater significance. Too rapid population growth seriously hampers efforts to raise living standards, to further education, to improve health and sanitation, to provide better housing and transportation, to forward cultural and recreational opportunities - and even, in many countries, to assure sufficient food. In short, the human aspirations, common to men everywhere, to live a better life, is being frustrated and jeopardized."

Population Reference Bureau

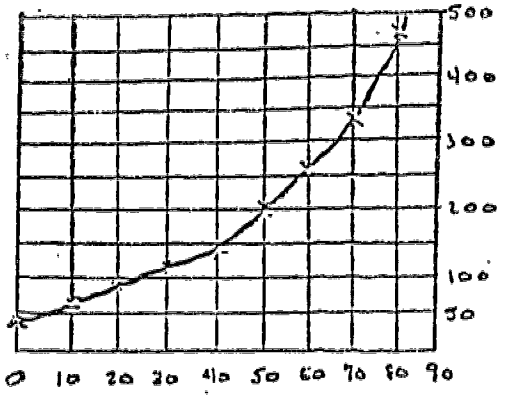
TURN THE PAGE FOR THE ANSWERS TO THE MAR'S COLONY PROBLEMS !

Answers to Guide Sheets 20 and 21

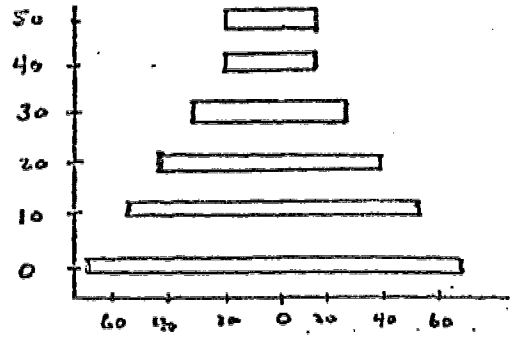
Mars I Community Population Data Table.

Year	Total No of People	No People At Each of Following Ages: Babies	10	20	30	40	50	Died
1	40	20		20				
10	60	20	20		20			
20	80	20	20	20		20		
30	120	40	20	20	20		20	
40	140	40	40	20	20	20		20
50	200	60	40	40	20	20	20	
60	260	80	60	40	40	20	20	20
70	340	100	80	60	40	40	20	20
80	480	140	100	80	60	40	40	20
90	540	120	140	100	80	60	40	40
100	840	240	120	140	100	80	60	40

Mars I Population Growth Curve



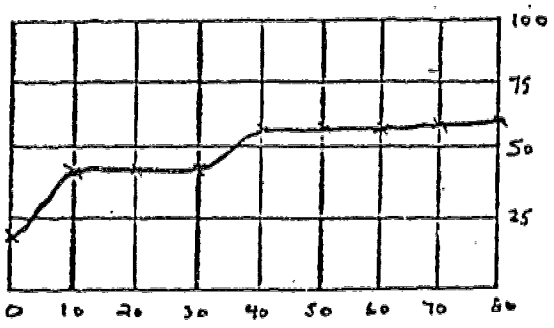
Mars I Population Age Structure After 80 Years



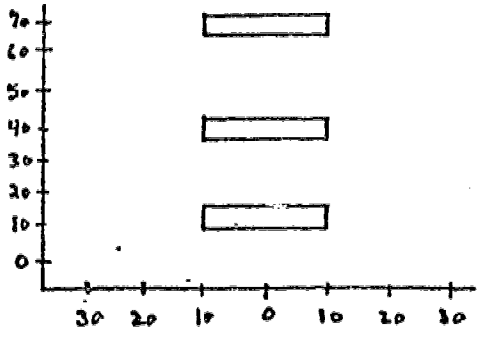
Mars II Community Population Data Table

Year	Total No. of People	No. People at Each of Following Ages: Babies	10	20	30	40	50	60	70	Died
1	20			20						
10	40	20			20					
20	40		20			20				
30	40			20			20			
40	60	20			20			20		
50	60		20			20			20	
60	60			20			20			20
70	60	20			20			20		
80	60		20			20			20	
90	60			20			20			20
100	60	20			20			20		

Mars II Population Growth Curve



Mars II Population Age Structure After 80 Years



NOW THAT YOU HAVE COMPLETED THE UNIT TURN BACK TO GUIDE SHEET # 1 AND SEE IF YOU HAVE MASTERED THE OBJECTIVES FOR THIS UNIT!

WORDS WORTH KNOWING

AGE STRUCTURE: the percentage of the population in each age category. Usually presented in the form of a bar chart or population pyramid with each age graphed as a percentage of the total population.

ARITHMETIC PROGRESSION: a series of numbers that increase by a constant number.

BIOSPHERE: all living things together with their environment. The biosphere is made up of ecosystems.

BIRTH CYCLE: the number of years it takes a woman to reach her childbearing years.

BIRTH RATE: the number of births of a population relative to the size of the population. Birth Rate is also termed Natality.

CARRYING CAPACITY: is the level of human activity (including population dynamics and economic activity) which a region can sustain (including consideration of import and export of resources and waste materials).

CENSUS: an official count, taken at regular intervals, of an entire population. Its origin - from the Latin word censere, meaning to tax - suggests one old and important use of the census.

CHARACTER: the details that describe a population - for example, race, sex, age, income, education, birthplace, and occupation.

DEATH CONTROL: the use of medical science and better food and housing to to keep people alive longer.

DEATH RATE: the number of deaths of a population relative to the size of the population. Death Rate is also termed MORTALITY.

DEMOGRAPHY: the science of vital and social statistics, as of the births, deaths, diseases, marriages, etc. of populations.

DENSITY: the number of persons that live in a unit area. Density is usually expressed as "persons per square mile."

DEPENDENCY RATIO: the fraction of the population dependent on the working members of that society.

DEVELOPED NATION: a nation usually having a low population growth rate (under 2 percent), considerable industrialization, and a high standard of living.

DEVELOPING NATION: a nation usually having a high population growth rate (over 2 percent), little industrialization, and a low standard of living. Most of the world's people live in developing nations, also called underdeveloped nations.

DISTRIBUTION: the spatial arrangement of the members of a population.

DOUBLING TIME: the number of years it takes for a population to double.

ECOLOGY: derived from the Greek "Oikos", meaning "house" or "place to live". The study of the relation of organisms or groups of organisms to their environment, or the science of the interrelations between living organisms and their environment.

ECOSYSTEM: an integrated unit or "system" in nature, sufficient unto itself, to be studied as a separate entity--e.g. a rotting log in the forest, a coral atoll, a continent, or the Earth.

ENVIRONMENT: the aggregate of all the external conditions and influences affecting the life, development, and ultimately the survival of an organism. From French "environs", surroundings.

FERTILITY: the ability to reproduce, that is, have babies. Compare with sterility.

GENERATION: the time span required for women to pass through their child-bearing years.

GEOMETRIC PROGRESSION: a series of numbers that increase by multiplying the previous number by a factor (number).

GROWTH RATE: the speed at which a population is increasing or decreasing for a particular year. Growth rate is the difference between the birth rate and the death rate, with additions or subtractions for migration.

LIMITING FACTOR: any resource which places limitations on a population.

MIGRATION: the movement of people from one area to another. The movement into an area is termed IN-MIGRATION. The movement of people out of an area is termed OUT-MIGRATION. The difference between in-migration and out-migration is termed NET MIGRATION.

NON-RENEWABLE RESOURCES: resources that once used cannot renew themselves. For example: coal, oil.

POPULATION: a group of interacting individuals of the same species or smaller taxa in a common spatial arrangement.

POPULATION CONTROL: the ways that humans and animals regulate the size of their populations.

POLLUTION: the dirtying of water or air with impurities, such as sewage, chemicals, and germs.

RENEWABLE RESOURCES: those biological resources which renew themselves by growth and reproduction.

RURAL: farm and country form of population distribution with low population densities.

SUBURBAN: residential form of population distribution. Predominately housing development complexes, located outside of central cities. They are often culturally and economically dependent upon the central city.

URBAN: centralized form of population distribution usually connotes a city with industrial, commercial and governmental institutions.

URBANIZATION: the migration of people from the countryside into urban centers (cities). This term also means the changes a growing city makes in the land and in the lives of people.

VITAL STATISTICS: a collection of numerical facts about vital (important) events in the lives of people, such as birth, adoption, marriage, divorce, and death.

BIBLIOGRAPHY

Callahan, Daniel. Ed. The American Population Debate. New York. Doubleday, 1971. 375 pp.

Collection of 23 papers which examines the question: Does the United States have a population problem? The alternatives presented in these papers provide for stimulating classroom debate issues.

Chamberlain, Neil. Beyond Malthus: Population and power. New York, Basic Books. 1970. 214 pp.

Written by a labor economist. Presents the economics of population growth and its influence on structure of government, business, income distribution and the conduct of international affairs.

Ehrlich, Paul., and Anne H. Ehrlich. Population Resources, Environment. 2nd Edition. San Francisco, Freeman. 1972. 509 pp.

A comprehensive, college level treatment of human population ecology. Includes also chapters on food production, pollution and population control. Highly Recommended.

Frankel, Lillian B. This Crowded World. Washington, D.C., Columbia Books Inc. 1970. 60 pp.

A concepts book for young readers.

Hardin, Garret. Population, Evolution and Birth Control: A Collage of Controversial Ideas. San Francisco, Freeman. 1970. 312 pp.

Intriguing collection of papers dealing with a wide variety of aspects of both historical and modern populations. Recommended.

Meadows, D.H. et. al., The Limits to Growth. New York, Universe Books. 1972. 205 pp.

The results of the computer-based analysis of current world population trends are presented and analyzed in this highly readable book.

Population Reference Bureau. A Study Guide to Population and the American Future. (No Date). 75 pp.

A secondary school level approach to population education. Treats basic population biology relative to America. To a large extent an inquiry approach.

Pringle, Lawrence. One Earth, Many People: The Challenge of Human Population Growth. New York, Macmillan. 1971. 85 pp.

A basic presentation of the problems of population growth.

Schaefer, Lawrence. An Introduction to Population, Environment & Society: A Teachers Resource Manual. E-P Educational Services, 21 Merritt St., Hamden, CT. 1972. 274 pp.

Provides both high school and adults a basic but thorough introduction to population characteristics. Excellent appendices include historical and current readings, and student involvement approaches.
Highly Recommended.

Sorvall, Vivian. Overpopulation: How Many Are Too Many? West Haven, Conn., Pendulum Press. 1971. 63 pp.

An easy to read and understand booklet introducing young readers to the basic characteristics and problems of populations.

Tape Script-PLANNING FOR PEOPLE I, II, & III

Take a look at spaceship earth on guide sheet #2...The earth is the third planet from the sun. It is 8000 miles in diameter, 27,000 miles in circumference and has a surface area of 197,000,000 square miles. It is inhabited by a population over 4 billion people. The earth stopped growing at least 4.5 billion years ago and it is not ever going to get any bigger. The population of people the earth carries is growing at a rate of 2 per cent every year. At that rate the population will double itself every 35 years indefinitely.

Now look at the map of Connecticut at the bottom of guide sheet #2. The legal boundaries of the state of Connecticut were set in the year 1685. At the time of the state census in 1790, Connecticut had a population of 240,000 people. Today, 165 years later, Connecticut's population numbers over 3 million people. It is the fastest growing state in New England. With a population that is increasing at slightly over 1 per cent per year Connecticuts population will double in 60 years.

For both the earth and Connecticut two things are almost certain. First, for a time, further increases in the population of Connecticut and the entire world are going to occur whether we are in favor of them or not, and second; the size, shape and basic physical characteristics of both Connecticut and the Earth will remain the same. In other words both the earth and the state are finite in size and as such, cannot be expected to accomodate infinite population growth. Stop the recorder while you study the graph of population growth at the top of guide sheet #3 and the chart of doubling time in part B of guide sheet #3. Sheer numbers of people are only one aspect of the problem of growth now facing us on every level. Every individual in a population has certain minimal needs, requirements and desires which society must provide. In short, we are all consumers, demanding goods and services. In addition, almost all humans aspire to greater and greater material wealth. To meet these demands, we use our resources to produce goods and services. The greater the demands, the greater the amount of resources consumed and goods produced. Due to our imperfect technology the process of production and consumption produce large amounts of wastes, which, in slightly concentrated form become pollution. In other works production, consumption and pollution follow the pathway at the bottom of Guide Sheet #3. More people demand more production which leads to more resource consumption which in turn leads to increased consumption of goods and services all of which produce increased waste and environmental degradation.

It now seems clear to many, that humans, with their infinite desires are headed on a collision course with their finite environment. What is our present situation and how can we prepare for the future? Some folks suggest that we adopt a wait and see attitude. They recommend that we permit our population to grow until it becomes obvious that continued growth is detrimental. At that point, they suggest that we stop population growth. Still others suggest that we are actually overpopulated right now. They form their assumptions primarily on the basis of our rates of resource consumption and environmental pollution. To these observers, a nation such as the United States, which has 6% of the worlds population yet consumes 30% of its resources and contributes upwards of 50% of the world's pollution is grossly overpopulated.

Which of these positions reflects your ideas? Perhaps you, like many would like to adopt a wait and see attitude. Scientists however, see danger in this action because of the way populations behave. To clarify the point, let's focus our attention on how populations grow. Populations grow in much the same manner as money gains interest in a bank. That is populations grow geometrically. A base of 2 doubles to become 4...4 doubles to become 8 ...8 doubles to become 16 and so forth. To consider how this works, take a look again at Guide Sheet 3, which shows a graph of the growth of the world-wide human population. You will note that the curve depicting the growth resembles the letterJ. When we look at the pattern of this growth we find that for much of its history, the human population grew only very slowly until 1650. Then, population growth slowly accelerated. In 1850 population rounded the bend in the J curve, and the growth rate dramatically changed. From the turn of the century on, the plot of the curve becomes almost vertical. Another way of demonstrating how rapidly the population is growing, is to determine how many years it takes a population to become twice as large. Look at the doubling time chart in Part B of guide sheet #3, (Pause). We estimate the world human population at the beginning of the Christian Era at about 250 million people. By 1650, at the time of the Late Renaissance the population had reached 500 million people. Thus it took 650 years for the population to double itself. 200 years later, by about 1850, the population had doubled itself again and reached the 1 billion mark. The world population reached its 2nd billion people during the depression year of 1930, a doubling time of only 85 years. The population has now reached the 4 billion mark, which means that the doubling time has now decreased to 45 years. If its current rate of growth continues the population will once again double itself in only 37 years. It is quite significant that the rate of increase, or the number of years it takes the population to double, is itself increasing and the population appears to be entering a phase best described as rapid runaway growth. Perhaps you can visualize how this runaway growth occurs by considering the example.

The thickness of the Guide Sheet paper you are holding is about 1/254 ths of 1 inch. If we double this we get only 2/254 ths of an inch. By eight doublings however, we have attained a thickness of 1 inch and by 15 doublings over 5 feet. After 23 doublings we would have a stack of paper 1360 feet thick. By 35 doublings we would have about gone around the head of the J curve and have reached a thickness of about 3000 miles. Now the consequence of geometric growth rapidly becomes apparent. By 42 doublings the thickness of that stack of paper is about 240,000 miles, which is the distance from the earth to the moon. Eight additional doublings brings the total to 50 doublings, and the paper which began its geometric growth with a thickness of only 1/254 ths of an inch is now 93 million miles thick, approximately the distance from the earth to the sun.

Obviously, such rapid growth of a pile of paper quickly becomes propoesterious. Yet dispite the warning of demographers and ecologist man has refused to acknowledge that the geometric growth of population has equally the same potential for runaway growth. The point we are attempting to make is quite simple. Infinite growth cannot continue in a finite environment. Sooner or later an equilibrium will be established that is open to question.

or later an equilibrum will
will be established, it is the manner in which the equilibrium is established that is open to question. Either society will achieve a stable population by "Conscious" lowering and regulation of the birth rate or nature will achieve equilibrium by dramatically increasing the death rate. The first choice represents a reasonable and rational approach to population growth, famine, pestilence and human misery.

The world population growth problem is often viewed as a problem of developed nations. To emphasize the falicy of that argument, let us consider two hundred years of growth in the American state with the highest per capita income. A growth curve and population projection chart are shown on guide sheet #4. Turn off the tape recorder while you study the population growth chart on guide sheet #4 and the fact sheet on Connecticuts population pressures on guide sheet #5. Turn the recorder back on when you are ready to continue.

The population growth problem is very real and effects affluent and poor societies alike. At this point in time, the decisions to be made regarding future population size and growth are largely individual. That is, they are decided on the basis of how many children you and I want. And that in turn is decided by what we feel to be the impact of people on ourselves, our families and our environment. Since most land use decisions involve planning for people, we have designed this unit to acquaint you with basic population characteristics. Using these tools you, as a concerned citizen, interested in local land use planning, will be able to make realistic assesments of local and regional population growth potential, the future allocations of land and other resources and facilities required for their support.

Let us begin with the basics. What is a population? An ecologist would define a population as a group of organisms of the same species interacting together and inhabiting the same geographical area. Because the human population is interacting on a world-wide scale we must, for investigative purposes, focus our attention on geographical populations. Thus we may consider the population of a country, a region, a state, and a municipality, collectively or separately.

The scientific study of human populations is called demography. Demography is concerned with the study of the vital statistics of a population. These vital statistics are generally obtained through a periodic census, or recording of the numbers of a population. The writers of the United States Constitution had the vision to realize the need for a periodic census. In Article 1 section 201 the Constitution, a census of the entire country is mandated every ten years. Most important vital statistics that can be obtained from a census include information on:

(1) growth rate
(2) birth rate
(3) death rate
(4) age structure of a population

Detailed information on major populations characteristics is given in pages of Guide Sheet #6 entitled, Population Statistics; What do they mean? This booklet, published by the Population Reference Bureau defines major terms used in population studies and describes formulas which are used in computing growth rates.. Stop the tape recorder while you read guide sheet #6, the Population Statistics Pamplet. After you have read through the pamphlet, you may find it helpful to keep it nearby for reference.

be used in Planning for people... First, let's consider the factors influencing population change. Look at Guide Sheet #7. Part A of Guide Sheet #7 shows how births, deaths and migration relate to the size of a population. Part B of Guide Sheet #7 gives both the word formula and the letter formula needed to calculate the vital statistics of a population.
From Part A, of Guide Sheet #7 you will note that the basic components which increase a populations size are births and in-migrators. The subtractive factors which cause a decrease in population size, are Deaths and Outmigrations. You can see that we measure whether a population increases or decreases on the basis of two factors: the Rate of Natural Increase, and Net Migration. The rate of natural increase is simple a measure of birth rate minus the death rate. Net migration is the difference between people moving into and out of an area. If more people are moving out, we have a minus or subtractive offset on a population. The reverse is true if more people are moving into an area. To finally determine whether a population is growing or declining we have to examine the growth rate. The equation for determining population gramihesatheigrowthtraten Guide Sheet #7 Part B.

If you have had trouble understanding this brief discussion of the meaning of population statistic, I suggest you stop the recorder and review Guide Sheets #6 and #7 (Pause). Now, how do these vital statistics apply to the world human population, which, as we saw in Guide Sheet #3, is rapidly growing?

When we consider the growth of the world human population we must consider only the affect of the rate of natural increase. Why?

The growth of the world-wide population is due only to differences between birth and death rates. To provide you with some insight into the rate of population growth, we would like you to carry out a simple activity. Look at the second hand of your watch. For every second that ticks by, there are approximately 4 births and 1 and ½ deaths. In other words in one minute there are 240 births and 90 deaths, or approximately 334,000 births and 134,000 deaths per day.

The growth rate can be calculated by subtracting the number of deaths per day from the number of births per day, 334,000 births per day minus 134,000 deaths per day means a growth rate of 200,000 people per day...1.4 million people per week, or 70 million people per year.

You may be wondering why there is such a difference between birth and death rates. Have birth rates risen recently? Actually birth rates have fluctuated only slightly in the past 200 years and are at the present time falling slightly. In contrast, death rates have shown an almost continuous decline for the past several hundred years. The introduction of antibiotics and modern medical practices on a world-wide scale, coupled with increased food availability as a result of the widespread use of pesticides, and the introduction of modern agricultural practices has resulted in a startling decrease in death rates, particulary among children. These factors acting in concert have caused many countries survive childhood and become parents themselves. High birth rates in many countries cancel the effect of increased in death rates from natural or man made disasters. For example, the catostrophic floods and disease of 1972 wiped out 500 thousand of Bangaldshes population. It took the survivors just 40 days to produce enough babies to make up the loss. Deaths in local wars are

also quickly replaced by new births. Population losses due to famine in one part of the world are balanced by increased population elsewhere. We cannot escape however, the coming famine and resource depletion problems which will occur if our present population growth continues. Somewhere throughout the world about 15 million people die of starvation each year. This is, in effect, a form of global famine.

The growth of the human population is not evenly distributed. Nationally, some countries are growing, some declining and some remaining relatively stable. It seems to be a paradox of growth that most of the third world or developing countries also have rapidly growing populations whereas many of the highly industrialized countries of the western world have populations which are nearing stability or growing only slowly.

Now let us apply the population characteristics we have discussed so far to Connecticut and selected towns and cities within the state. To carry out the activity, you will have to find Guide Sheets #8 and #9. Part A of Guide Sheet #8 presents a map of Connectucut, showing the population changes which occured in several metropolitan regions during the 10 year decade ending in 1970. The total population of the region is represented by the size of the circle. The population increase which took place between 1960 and 1970 is indicated by the size of the pie slice. Turn the tape recorder off while you answer the question under the map on guide sheet #8 (Pause).

As you can see, all of the metropolitan regions identified on the map increased in population during the period between 1960 and 1970. From your observations, can you see that population growth was not evenly distributed throughout the state. My estimate is that Danbury region had the largest percentage growth while the Meriden area had the smallest percentage growth.

Now, look at the table at the bottom of Guide Sheet #8. Table 8 presents information on the population changes of selected Connecticut towns and cities between 1920 and 1970. The data for these tables was obtained from a booklet entitled "Connecticut Towns and Country Fact Book" published by the University of Connecticut. Similar population fact books have been compiled for many towns, cities, counties, and states. You may want to refer to your town library for population information directly pertaining to your area.

Now lets go back to the table at the bottom of Guide Sheet #8. From the table we find that over the 50 year period from 1920 to 1970 the population of Connecticut was almost tripled. We also find that this population growth was far from uniformly distributed when the individual towns and cities of the state are considered. Connecticuts cities have varied in their population changes. Some towns such as Cheshire, Hamden, and Middletown showed a relatively large and rapid growth while others, such as Derby and North Canaan remained almost stable. Still others, such as New Haven and Bridgeport actually decreased in size during the fifty year period. Stop the recorder while you study the table further and answer the question listed below the table.

The average annual growth rates that have occurred in many Connecticut cities and towns are chronicled in detail in the table on Guide Sheet #9. Guide Sheet #9 shows the per cent change in population size which took place over each decade between 1920 and 1970. Read through the questions on Guide Sheet #9, study

der while you carry out this activity.

Some major factors affecting population growth in selected Connecticut Cities and towns can be found on Guide Sheet #10. This table details the sources of population changes from 1960 to 1970. Remember, populations may change in size in either of two ways, by changes in births and deaths, that is natural increase (or decrease) and by differences between in-migrations and out-migration, termed net migration. Guide Sheet #10 suggest the relative importance of these two sources of change for the population of Connecticut. (Pause). Which factor, natural increase or net migration had the greatest impact on Connecticuts population growth? Which town lost the greatest number of people due to out migration? Which community had the lowest rate of natural increase?

Information from charts such as this can be very helpful in describing the rates of population change for our communities and for determining what factors have been responsible for the change. To see how the table can be used to describe factors affecting population change lets study the respective populations of New Haven and Hamden during the period from 1960 to 1970. From the second column of the table on Guide Sheet #10 we find that New Haven's population decreased by 9.4% during the decade from 1960-1970, whereas Hamden's population increased by 20.2% during the same period. Therefore Hamden's population is growing whild New Haven's population is declining. Interestingly enough we find from the natural increase column that both Hamden and New Haven have a positive rate of growth. That is, there were more births than deaths in both towns during this period. To what then, can we attribute the fact that the population of one town is increasing while the other is decreasing? The answer is to be found in Net Migrations. Here, as we compare the two communities we find that 28,046 more people moved out of New Haven than moved into the city during this time. In contrast, we find that 6,095 more people moved into Hamden than moved out of Hamden. This is verified by looking at the third column section of the table which shows the comparative percentage changes due to net migration and rate of natural increase. Here we find that 73.4% of the increase of Hamden's population was due to net migration, or an increased number of people moving into the town. The reverse is true for New Haven, where almost all of the cities population loss is due to people moving out into the surrounding subarban and rural areas. Turn the recorder off whild you study Guide Sheet #10 further. (Pause).

Besides knowing the total number of people in a population and the growth rate of the population, it is often useful to know how the individuals in a population are distributed by age groups.

The distribution of people in various age brackets has serious planning implications for communities. This data is valuable in planning for schools, housing, and recreational needs among other factors. Lets begin by using a common frame of reference.

How many people were or will be in your graduating class? Was the size of your class larger or smaller than the class before you? Was your class larger or smaller than the class graduating after you? How many people do you know over the age of 60? The age of 70? How many people do you know who are less than 20 years of age?

If you were to take a survey of your town's population, you would find that it is composed of people of all ages, but you would find that is is composed of more people of some age groups than others. If you catalogue the numbers of people in specific age groups as a portion of the total population you have constructed what is called a population age pyramid.

A population age pyramid contains information on the past history, present status and potential future of a population. Refer to guide sheet #11, part A as we continue the narrative (Pause). An age pyramid provides a visual image of the age structure of a society. The vertical axis shows different age groups. The horizontal axis shows the number of people in each age group.

Usually the pyramid is divided in half. The left side representing the males in the population and the right side the females. What causes changes in the age structure? High birth rates, as mentioned above, produce large numbers of children and give the pyramid a larger base. On the other hand, low of falling birth rates produce a smaller proportion of children in the total population and give the pyramid a narrower base.

Death rates also change ths shape of the pyramid. As death rates rise for any particular age group, e.g.., young men in time of war, the band representing that age gorup would be smaller. If fewer infants and children die and if people in general live longer, we say the survival rate is increasing. Changing survival rates will affect the shape of the pyramid at several ages. For example, if infants survive to the reproductive age, the children they bear will increase the base of the pyramid.

Migration is the fourth major factor that affects age structure. When people of a particular age group leave the country, they change the age sturcture of the area they are leaving as well as that of the region to which they are moving.

Part B of Guide Sheet #8 shows the age pyramids of three different types of populations. A demographer would suggest that population 1 is a young population which is growing rapidly. Why? Because high birth rates have produced large numbers of children, and as a result the age pyramid has a large base. Populations which are experiencing a "baby boom" would have this general type of age pyramid.

Pyramid 2 represents an older average age population. What evidence is there to suggest that this is an older more stable population? The relatively even numbers in each of the younger age groups suggests a low birth rate. As a result the population pyramid has a relatively narrow base.

What does the inverted base of pyramid 3 suggest to you? For some reason the number of births in this population are so low that the population isn't even replacing itself. In fact, if it continues in this way the population will eventually be reduced to zero.

Look again at pyramid 1. A very large proportion of this population consists of children less than 15 years old. These are the future generation of parents. That is, they will soon be mothers and fathers of the next birth cycle of the population. What do you suppose will happen to the population size if the youth of the population want the same number of children as their parents; correct! The base of the pyramid will be wider yet.

Population pyramids can also provide information on the effect of world events or natural disaster upon a population. Look at the age pyramid in the box at the top of Guide Sheet 11. Can you locate the decreased population age groups born during WWII....Can you locate the past WWII baby boom age groups?

Population pyramids can also provide information on a societies dependents and producers! Is there a student in your home who is claimed as a deduction? If the answer is yes, then they are a dependent. They consume the same goods and services as does any other individual in your society but they do not help to produce them. Neither do some ritired individuals. Students have something in common with retired members of society. They are both part of the dependency load of a population. Generally, individuals between the ages of 16 and 65 are the producers in a society. They manufacture the goods and services to be consumed.

Now take another look at the three population age pyramids. Which population has the largest number of dependent people? Which population has the lowest number of dependent people?

Pyramid 1 has a very high dependency ratio mostly consisting of children. These young dependents will require food and shelter, in addition to health services and schools. The pyramid for population tells us that this population has a very large number of older individuals who may require such services on low cost housing, nursing homes, leisure recreation faculities and health services-all of which will have to be provided by the productive members of society.

To see how we calculate the age dependary ratio of a population look at Part C of Guide Sheet #11. From the formulas you will find that to obtain the Youth Dependary Ratio we divide the number of people under 15 by the number of people between the age of 15 and 59, which represents the work force of the population. We multiply by 100 because we want to express the youth dependary ratio as a percentage. To find the aged dependary ratio of a population we add the aged and youth dependary ratios together.

Now let us use the concepts of age distributions which we have just covered to examine the age pyramids of selected towns in Connecticut. Look at Part A of Guide Sheet #12. Here on Guide Sheet #12 A we have a table of age distribution information for questions on a piece of scrap paper. Which towns have populations which are growing, which seem to be declining, and which towns seem to be remaining stable? How does the depending load of the town of New Canaan compare to the dependency load of New Haven? Which towns may require the constructions of new schools? Which may require the construction and establishment of health facilities for the aged? Stop the recorder while you answer these questions - (Pause).

In Part B of Guide Sheet #12 you may try your hand at constructing an age pyramid. You will note that we have constructed an age pyramid for the town of Groton, Connecticut from the age distribution table of Part A. To do this, we have placed the 8 age

categories on the perpendicular axis to the left, and numbers representing population size on the horizontal line at the bottom. You will also note that the size range begins at 0 in the center and extends to 3,000 individuals of either side. Now to construct our age pyramid for a given age group. We take the size of the population of males in the under five category and make a mark at the point approximately 2,291 individuals to the left of the center line. We then make a mark at the 2,140 individual point to the right of the center line, indicating the number of females in the under 5 year age group. We then draw the block and move up to the 5-9 age bracket where we repeat the process.

Remember, in an accurately drawn age pyramid. the number of people to the left of the center line would indicate males in the population while the number of people to the right of the center line would indicate the number of females. When we have completed the process for each age group we end up with an age pyramid like the one shown. Now try to finish the age pyramid for Middletown, Connecticut. When you have completed Middletown's age pyramid, compare the structure of the populations of these two Connecticut Communities. Stop the recorder while you construct the Middletown age pyramid (Pause).

Both Middletown and Groton have approximately the same population size, that is, roughly 40,000 people. Do they exhibit the same population composition? (Pause), Do they appear to be growing at equal rates?

Based on our previous discussions of population age composition, what inferences can you make concerning such things as the dependency load ratio, growth trends and services each of the two towns will require.

You might have infered that dependency ratio helps predict what portion of the population is paying for the services for the young and the elderly. Later in the unit, we will discuss how the age structure can help one predict the needs that will influence land uses.

Another important aspect variable in planning for people is the distribution of any population in a given area. For instance, take a sample of your feelings! When do you feel crowded? In the city? In a subway? Driving through the country? At gefbopbelb game?

When you feel the pressure of many people around you how do you react? Do you take a drive in the lonely stretches of the country? Or perhaps go for a hike in the woods seeking solitude? You are reacting to the distrubution and density of your population.

Population distrubution is how the members of a population are separated in space. On guide sheet #13, there is a graphic representation of the population distribution of several towns. The map indicates the distribution of population within the town by placing one dot for every 50 people. Clusters of dots indicate concentrations of people. Stop the recorder whild you study Guide Sheet #13. It may be useful for you to prepare a population distribution map for your community. We will return to the importance of the population distrubution in the synthesis unit as we discuss proxmity requirements of commerical land uses to populations.

The relationship between a population and its living area is called density. Thus to find the density of a population we simply divide the number of people by the area. For example, the earth has a surface area of 197 million square miles and a population of 3.8 billion people. To find the density of people we divide the number of people by the area and find a result of 19.6 people per square mile.

The population density of the United States is about 57 people per square mile. Yet, as is shown by the diagram on guide sheet #14 Part C the United States does not have a uniform population density. Instead, certain areas of the United States, such as the eastern seaboard, have very large population densities. Other areas, such as the intermountain states, have comparatively fewer people and may be said to be sparsely populated. By way of further comparison, the population density of the United States is quite low compared to the population density of ~~the~~ ~~U~~ ~~to~~ ~~the~~ countries which may have over 500 people per square mile.

To further examine the concept of population density look at Guide Sheet #14. Part A of Guide Sheet #14 is a table listing the present population densities of several towns in Connecticut plus the actual land area of the town in square miles. You will note that for the state as a whole, the density or number of people per square mile is 622. (Pause) The table also tells us that the density of the states population has increased by 51 percent during the 20 year period between 1950 and 1970. According to this table, which Connecticut towns had the the highest population density in 1970? You are right, New Haven! According to the table New Haven, with a land area of 18.4 square miles, had a grand total of 7484 people living on each square in 1970. Now try to locate the town with the lowest population density...(Pause) Right again! Sharon, which has over 3 times the land area of New Haven or 59.8 square miles and a population density of only 41 people per square mile.

To help you visualize, what such disparate population densities mean, in terms of the spatial distribution of people, perform the examine given in Part B of Guide Sheet #14 using the towns of Bristol, East Windsor and Roxbury. Each of these three towns has approximately the same land area of 26 square miles, Yet they have very wide differences in population density. Stop the recorder, while you carry out this activity.

There is quite a difference in population density between the Bristol box with 42 Xs versus the Roxbury box with only 1 X. By now you can easily see what population density means in terms of the space available for each individual making up the populations of the three towns.

Population density and distribution are important factors to consider in planning for people. To continue our planning, we must consider the relationship of a population to the ability of its environment to keep it supplied with adequate quantites of food, water, air and materials used by the society. This relationship is called carrying capacity. For example, to apply the carrying capacity concept to a population of sheep living on a range, we would suggest that, a population of sheep is equal to the carrying capacity of their range land when the daily food and water requirements of the sheep are met by the actual land productivity of vegetation and water on a sustained yield basis. The balance between sheep consumption and range productivity may continue indefinately.

When we consider how to apply the carrying capacity concept to humans and their environment, we find the complexity of the relationship increases. Humans relate to their environment based on their cultural patterns. That is, by virtue of culture, humans require more than simply food and water from their environment. They also require the materials necessary to manufacture the foods and produce the services which are necessary for their life style. In addition an effective series of institutions are required to sustain the society. To help you understand the concept of a human carrying capacity, the

following analogy may prove useful.

Remember the Titanic? She struck an iceberg and sank in 1911. A total of 1,845 lives were lost, because the carrying capacity of all of her lifeboats was insufficient to accomodate all of her passengers.

We may also visualize the carrying capacity of a population environment as a series of lifeboats, as is shown in Guide Sheet #15 (Pause). The first lifeboat is labeled the Resources Lifeboat. All populations require a variety of materials and energy from their environment. These may be termed resources. We customarily classify resources as renewable or non-renewable, depending on whether they can be regenerated by the environment or whether they are finite. Renewable resources include water, trees and food. While, non-renewable resources include minerals and most forms of energy. Non-renewable resources are available in finite quantities. They are present in limited amounts which, when used up, cannot be replaced.

The rate of use of both renewable and non-renewable resources is directly related to the total size and standard of living of a population. For example, between 1960 and 1970 the world population increased by 20%. During the same decade the use of iron rose by over 250 percent, of copper by 200 percent and of aluminium by 900 percent. Resource consumption is not equal among the nations of the earth. The most affluent nations tend to consume the most resources. We have already noted that the United States, with 6 percent of the worlds population, consumes 30 percent of the world's resources. When all of the nations of the Western World are considered together they consume approximately 90 percent of the worlds total resources but they contain only 20 percent of the world's population. For how long will this situation continue? Remember the slide of space ship earth? It represents a finite environment. That is, the amounts of all of the earths non-renewable resources are fixed. Once they have been used up we will be unable to obtain any more supplies.

On the local and regional level the available resources determine the level of production and therby the level of employment which an area can sustain. If an area's resources are in short supply its carrying capacity is diminished and its population declines as the resources are consumed or lost. The ghost towns of the old West are a classic example of what can happen when a communities resource supply is depleted. When the gold and silver ran out, the mining towns died.

Lifeboat 2 represents the production of goods and services for a population. It includes the factories and shops needed to produce the goods, plus the transportation facilities required to distribute them.

The consumption lifeboat, number 3, refers to a societies demand and requirement for goods and services. Every individual of a society is by necessity a consummer. His level of consumption will be determined by his wealth and power. In order for high consumption demands to be met, production levels and resource usage is increased. If resources are insufficent they will have to be subsidized by imports. Now let us consider the pollution lifeboat. Pollution is really excess waste material from production and consumption. We consider it important because pollution creates conditions of stress on humans and their ecosystems-conditions which are rapidly worsening.

When our society was young and our population much smaller wastes were dumped indiscrimately into lakes, rivers and the air. In effect, the prevailing policy was that the solution to pollution was dilution. But our environment's capacity for the absorption of wastes is limited,

and when those limits were exceeded we have pollution.

Unfortunately, the production of wastes and therefore pollutants is directly related to the level of technology. If pollutants increase beyond optimum limits they rapidly become health hazards. Two recent well known examples include mercury poisoning and smog.

The carrying capacity of each of these lifeboats can be quickly exceeded. Indeed, many of them may already be overloaded. Their load will influence the carrying capacity of the fifth lifeboat, which represents the quality of the living environment. We generally consider an area to be environmentally acceptable when a certain minimum level of goods and services are manufactured and consumed and there is a low or negligant amount of pollution. What alternatives are possible? How may we increase our carrying capacity? To increase the carrying capacity of people, that is, increase our populations size, the lifeboats may pick up more people, thereby increasing the overall load of all of the lifeboats. If we increase our population size we must be willing to tolerate increased levels of pollution and a decrease in our quality of living. Or, conversely, we can increase our population size and decrease our consumption and production of goods per individual, thereby decreasing everyone's quality of life environment. In other words we are trading off clean air for dirty air, quiet for noise pollution, clean water for dirty water, spaciousness for crowded conditions - all to meet the production and consumption demands brought about by increasing our population. These are the types of choices which are available to us in our finite environments-and they-like the lifeboats-can only stand a limited amount of crowding.

In summary, we might point out that recognition of a region's carrying capacity forces us to become aware that all environments are finite and that they therefore place limits on population growth and activities. Therefore it is absolutely essential that the carrying capacity of a region be taken into account in regional planning and evaluation.

Consider how the carrying capacity of your town affects you. What other factors in your community place constraints or limits on the size of its population? What about the available space for housing? And how about roads for transportation. Are there certain roads in your town which always seem to have too many cars on them. Project what they will have if your towns population doubles in size.

Welcome to planning for People Part III.

At the beginning of the United States Constitution- in the fifth paragraph in fact- the decennial census is established as a part of American life. In order to apportion properly both Congressional seating and Federal taxes, the Founding Fathers required that an enumeration "shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct." The section of the Constitution establishing the census is reproduced on Guide Sheet #16. Accordingly, the first census was taken in 1790; it reported a population of 3,929,214. The last regular census, in 1970, counted 203,185,000 Americans.

Many Americans believe that through this provision the framers of the Constitution sought deliberately to provide for the new Nation a planned system of social statistics. History does not support this view. Although census-taking was well known in countries from which the colonists came, it was mainly associated with taxation or military conscription. Thus the census had little appeal to early Americans. The Constitutional Convention sought simply a way to fairly apportion membership in the House of Representatives, at the same time assigning to each State its proper share of the debts remaining from the Revolutionary war.

Even as our population has grown in size over the decades, so the functions of the regular census also have expanded. Today, we are interested not only in an accurate counting of heads, but also in a better description of our social condition. We know that unless a people can be adequately informed about their present, they cannot make intelligent judgments about their future.

An example of the way census data can be used by government can be illustrated with the hypothetical city, Urbanville. The city of Urbanville wants to know how many children will be enrolled in primary school each year for the next decade, because it must plan ahead to raise money and to contract for new schools if they are needed, hire more teachers, add buses and drivers, and so on. So tables reporting census data for Urbanville residents are examined; they show how many children living in Urbanville are five years old, four years old, three years old and so on. The number of married women of child-bearing age will also be noted. This figure can be used, along with estimates of the average number of children born each year and the average family size, to predict the approximate number of children who will be born in time to attend school by the later years of the decade. Governments at all levels-federal, state, and municipal facilities, but also to plan care for elderly, build adequate public housing and calculate the number of men that will be eligible for the draft.

Census data can provide us with large amounts of information on a community abd its population. It is important to remember however that the census is a measurement of the population at one particular time; it is rather like a photograph capturing just one frozen moment of a continuous action. It is the task of the demographer to try to piece together, using vital statistics, some explanation of the events that took place before the census, and those that can be expected to take place after the census.

Before we begin to analyze the information from the census in terms of its relation to land use decision making, it is important to refresh your memory about the questions on the census form that you

sheet #17. Read through the questions on the form with particular attention to the questions that you believe relate to land use decision making. Stop the recorder while you study the census form on guide sheet #17.

The number of publications and analysis produced from the census are too numerous to list. However, it is valuable to our use of census data in land use decision making to use as a model studies produced by a regional planning agency. The studies in the next section have been prepared by the Southeastern Connecticut Regional Planning Agency. As we work our way through the examples of the utilization of population data feel free to stop the recorder to study the guidesheet.

As we proceed through these guidesheets we will quote excerpts from studies that utilized the data.

Population age sex characteristics for Southeastern Connecticut are shown on Guide Sheet #18 Part I (Pause). The agency concluded after a study of age structure:

This grouping of age-classes generally corresponds to the stages of one's life cycle. Most absolute growth took place in the student-young workers category followed by the children category. Mature workers increased slightly more than prime workers while the retired increased least. The bottom of Guide Sheet #19A shows these age groups as a percent of the total population compared to 1960. Children remain the largest category down slightly from 1960. The significant change is the continued decline of the prime worker category, which is only 1/10 percent behind mature workers in percentage of total population. Statewide, this age group of student-young workers also accounted for the biggest age grouping change since 1960, growing to over 16% of the state's 1970 population.

Did you notice the emphaisi on workers, especially young workers? By inference, the planners are suggesting the need to plan for more job opportunities. How will this affect the communities land use decisions?

Let's continue. Turn the page to guide sheet #18 Part II. Commutation patterns of residents can be determined by comparing town of residence and town of employment. Based on this type of analysis presented on Guide Sheet #18 Part II the regional planning agency concluded:

"The uneven distribution of population and jobs makes for a complex commuting pattern within the region. Data from the 1970 census do not permit a fully detailed analysis of commuters, but they do allow us to identify the commutation of workers from the region's towns to the major employment centers in the three urban communities. Figure 6 displays this pattern graphically. Perhaps the most striking aspect of this map is the dominant role played by the Town of Groton in the employment structure of Southeastern Connecticut. A second pertinent point is the regional nature of the area's economy. No single community emerges as being totally self-sufficient."

What land use considerations follow from this analysis? If your answer was transportation land use, you are correct. These might include land allocated to mass transit, commuter lots, highways, etc.

The study continues:

"It should also be mentioned that population growth increases in the suburban and rural towns did not include a similar increase in job opportunities within the town boundaries. Two-thirds of the civilian labor force in Southeastern Connecticut work or com-

the region's employed labor force compare similarly with other areas of the state, although the pattern of distribution varies with the individual towns. Land zoned for commercial and industrial use exists in many of the usburban and rural towns. But while opportunities for industrial development exist in Southeastern Connecticut, employment growth has not kept pace with population increases in the suburban towns."

The planning agency analyzed the family organization information in the format of Guide Sheet #18 Part III.

"According to the 1970 census definitions, a family consists of a household head and one or more other persons living in the same household who are related to the head by blood, marriage, or adoption. In this report, "family" shall also apply to male and female primary individuals.

Husband-wife families are the dominant household unit in the region. (See Guide Sheet #19B) 70% of the 64,388 families are husband-wife units. Regionally, the female primary individual (a single female living alone or with nonrelatives comprises the next largest family category. Relative female longevity may explain the higher number of female primary individuals as compared to male primary individuals.

Female-headed households are the third largest family type in Southeastern Connecticut. Whereas a great number of female primary individuals may represent widows (childless or with children grown and moved away from the household) as well as unmarried women, female-headed families are those where children of various ages (dependents) are present. Female headed households, which comprise 10% of the total number of families in the region, are those families where women have been widowed, divorced, or separated from their husbands.

Black families follow a somewhat different pattern of organization form that of the region's population as a whole. While husband-wife families, too, are the dominant household unit, the number of female-headed households is substantial. They account for 21% of all black families.

Based on the analysis of family organization data, the regional planning agency concluded:

"The family profile provided by the census data indicates a need for additional day care centers in towns where there are large numbers of single-parent families or poverty level families whose need for day care is denied as they live in towns which do not presently have day care centers. Female-headed families, and other male-headed families, which combined account for 12% of all families in the region, have a particular need for day care facilities for the pre-school age children while the parents seek and/or maintain employment."

At age 65 where do they go? Large houses requiring constant attention and maintenance, and high taxes coupled with comparatively low pension and social security benefits force many older Southeastern Connecticut residents to move from their owned homes into rental housing which may be desired by in many of the suburban and rural towns prohibits the building of multi-family units, the elderly often must move to the urban towns. Moreover, lower rent housing which may be

desired by retirees is usually limited to urban areas where the public facilities, as well as the population and economic profile meet the requirements of federal grants which finance the low cost rental units.

In many cases the cities offer the distinct advantage of dense commercial areas, which are generally close to the rental housing. Medical facilities are also clustered in the urban towns of New London and Norwich. In an area without the benefit of mass transit (specifically buses), travel from outlying suburban and rural areas to shopping and medical centers is a problem to the retiree without a car, or no longer able to drive.

On Guide Sheet #18 Part IV. There is a summary of one aspect of income data - poverty status. The illustrations present data on relationship of peverty persons, their location and their family structure. The planning agencies report continues:

Efforts by cities such as New London and Norwich to "break up" concentrated pockets of poverty within their boundaries has usually involved the construction of federally funded low-cost rental housing in other areas of the cities. A move out of the city is not a recommended course of action at this time when employment opportunities are extremely limited in the suburban and rural towns. At present, the majority of poverty level families and unrelated individuals are limited to the cities where jobs, low-cost housing, and limited public transportation are available.

There are many other uses of census data. Of particular value are the section that deals with the quality and availability of housing. If you recall page 3 of the census form contains questions on kitchen facilities, water service, toilets, showers, telephones, rent, etc. These answers to these questions can provide valuable guides to town leaders in planning social services.

Is there a need for new housing or rehabilitation? Do the elderly have access to a phone? How old is the housing?

In order to help organize the census data for your town, we have provided a summary table on Guide Sheet #18 Part V. In column 1 of the table the data for the state of Connecticut is listed. Column 2 contains data for the hypothetical town Upland, Connecticut. In Column 3, there is room for you to enter the census data for your town.

Take the time to assemble the data for your town. It will provide a base for future planning considerations in your community. Guide Sheet #18 Part VI contains a list of sources for statistical information on your town.

Lastly, let us consider one of the most variable of all of the attributes of a population. The attitudes of people which comprise it. You know, people have different ideas about almost everything-For example, about what age they would like to get married and how many children they should have. They even have different ideas about what a good population size is and what community goods and services they think they need.

To gain insight into local attitudes you may want to survey your town. A sample survey is provided in Guide Sheet #19. Part A of the survey on guide sheet #19, is designed to determine citizen attitudes toward the existing planning activity in your community. On the same page Part B allows a citizen to evaluate human relation and cultural enrichment conditions in your area. On the next page, Part C encourages evaluation of economic development activities. Physical Environment condition and environmental qualities are evaluated in Part D. Section E allows a citizen to evaluate services in the community.

Beginning with section F, the character of the survey changes. A citizen is asked to indicate the priorities they place on the spending of tax dollars. A major issue in planning philosophy is which services, responsibilities, or powers should be regionalized. In part G, the participant is asked to express their opinion on this issue.

What part does population growth play in the problems that exist in your community. The questions in part H elicit citizen opinions on this controversial issue. The value of open space is the topic of part I.

Section J, asks the citizen to list the three priorities for new projects that your community should have. In section K and L, the survey participant is asked to list the people, organizations and businesses that are most influential in their community. The answers to these questions can be most important in finding an effective spokesman for community planning issues.

Finally, the questions in Section M allow for an analysis of the participants in the survey by sex, age, employment and mobility. The survey is an extensive document. For your community it may only be necessary to use several sections. The entire survey is presented on guide sheet #19 so you would be able to select and modify sections that applied to your community. How does all this relate to land use decision making? Community needs and services such as recreation, open space, housing, police, fire, public buildings, roads, public transit, water supply and many others, all require land. It is the planning process that allocates space to each need that the Synthesis A-T considers. Review the survey. As you read each question consider whether the question is appropriate for your community and how it relates to land requirements. Stop the recorder while you completely review the survey. (Pause).

Several methods can be used to conduct the survey. The following are suggestions for your consideration:

1. A door-to-door or scientific sample survey by an organization set up specifically for this purpose.

2. A high school class or older 4-H members doing the contact work under proper guidance.

3. A survey involving all households or organized on a scientific sample basis.

4. Businessmen in the community asking customers to complete the survey.

In your community servey you may be surprised to find many people who consider continued population growth to be necessary for our way of life. That is, they equate population growth with prosperity. They may in fact, even tell you that continued growth is necessary for our economic existance. They are reflecting our cultural heritage which suggested that growth is somehow American, that it has been a part of the conquest of our frontiers and our expansion. Today, even some countries hold this viewpoint. Recently, both Japan and Greece, faced with declining fertility rates and the probility of a stabilizing population offered incentives to increase the number of children per family. The countries thereby hoped to avert a stagnet or declining economy.

How would you respond to this philosophy? What suggestions and

solutions might you want to consider in a discussion of a town's population growth with other community members.

In your discussion you will want to consider a variety of ways in which population growth influences a town. For help, let us again turn to our sample survey questions on Guide Sheet #19. For example, do you see a relationship between Upland's population and the construction and placement of business and housing? The larger a town's population, the greater its housing needs. Therefore planning and zoning for adequate housing to meet Uplands present and future population size is important. The placement of housing facilities is also important. They should be built within reasonable distance of businesses and such services as schools, police, and fire protection and adequate roads. Or, if roads, water and sewage services are not present, they must be constructed. At the same time other factors must be considered, for example, the preservation of open space and the need for an attractive downtown design, all of which provide for an attractive quality of life environment. Obviously, the construction of new facilities and the preservation of open space are conflicting land uses. The town of Uplands population growth will necessitate some housing construction which will in turn entail some loss of open land. The question then becomes a matter of acceptable trade-offs.

What other survey results may merit discussion? What about the relationships between Uplands age structure and the human relations and cultural enrichment conditions determined in Part B of the survey? Of paramount importance is the availability of work opportunities, both for adults, and also for youths just graduating from high school or college and entering the job market. Are there adequate jobs available right now in Upland, or is it necessary for some of the town residents to seek employment in nearby areas? What about the availability of jobs for school graduates? Based on the age structure of Uplands population, will there be a need for greater or fewer number of jobs in the next 10 years? Do you think the survey participant considers the question of job opportunities for their children, when they stop to consider the number of children they desire? Do you think their decisions regarding family size might be influenced by such considerations?

Let us next consider the relationships between the town of Uplands present population age structure and size and the services it requires, information on which was gathered in Parts E and F of the survey. Will there be a need for greater or fewer schools in the future? What types of schools will have to be increased in size? Decreased in size? For example, the renowned "baby boom" is now over, will there be a decrease in the need for elementary and secondary schools? Will this be replaced by an increased need for adult education schools. Answers to each of these questions will have to be met by the town planning board, which is fully aware of the tremendous expense of modern education.

Finally, the results of your survey will tell you something of the demand for recreational opportunities, and will give you insights into what specific types of recreational opportunities are needed. By examining the results, you may find a relationship again between the age structure of Hamden's population, their occupation, and the types of recreational opportunities they feel best meet their needs.

For example, from Part I young people will probably value such sites as a park or local lake highly. Young families may also find these two areas attractive. Boys and men will probably be quite interested in the value of the local streambelt for its fishing opportunities. Many adults will find the golf courses and game preserves to be the most valuable recreational opportunities offered by the city while perhaps older, retired individuals will prefer such sites as the town green.

Can you see any other interesting relationships that might evolve from survey results? We hope that you will have found some new and interesting avenues to explore.into the relationship between a population and the area in which it lives.

Now, let us test your understanding of each of the population relationships which we have discussed in this unit by giving you a hypothetical population to work with! Look at Guide Sheet #20 which gives you a brand new population just starting out. First, you will note that the individuals comprising the population have very definate life space limitations, apparently caused by the presence of a new atmospheric gas. At any rate everyone lives to the same approximate life span and then dies during the 50-60 year old age intervals. Apparently a new and unknown chemical in the Martian water courses couples to have 2 children at the age of 20 and 2 at the age of 30; and the sex rates of all offspring will be equal. First, plot in the numbers of people in the first year, We know that there will be 20 people, each of which are twenty years old. We also know that they form 10 couples, and from our population characteristics, each of those couples will have 2 babies - or a total of 20 babies at this time. Therefore, the total population during the first year on Mars will be 40 people. Now let us try ten years later. At this time the 20 people who were 20 years old will all be 30 years old, so we place them in the 30 year age column. Their 20 babies born in the first year will now be 10 years old. Now we also know that the 10 couples will each produce 2 more babies now that they are 30 years old for a total of 20 new babies. How many people will the total pupulation now consist of? 60, right? You may find it to be fun to fill out the chart completely, then plot the growth force of the population. Would you say this is a rapidly growing population? Take a look at the structure of its age pyramid! Based on our discussion of population resource requirements, what kinds of goods and services will this population require at, for example, 20 years, 40 years, 80 years? Do you see a trend in the appearence and placement of importance of different forms of goods and services, such as health and education, during the 80 year span of this populations existance?

Now that you are experienced at the population exercise try a similar activity on Guide Sheet #22. Turn off the recorder (Pause).